Carrier
United Technologies

WeatherMaster®
50HCQ04-12
Single Package Rooftop Heat Pump/Electric Heat
with Puron® (R-410A) Refrigerant

Service and Maintenance Instructions

CONTENTS

CONTENTS (CONT)

SAFETY CONSIDERATIONS

Improper installation, adjustment, alteration, service, maintenance, or use can cause explosion, fire, electrical shock or other conditions which may cause personal injury or property damage. Consult a qualified installer, service agency, or your distributor or branch for information or assistance. The qualified installer or agency must use factory-authorized kits or accessories when modifying this product. Refer to the individual instructions packaged with the kits or accessories when installing.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloths for brazing operations and have a fire extinguisher available. Read these instructions thoroughly and follow all warnings or cautions attached to the unit. Consult local building codes and appropriate national electrical codes (in USA, ANSI/NFPA70, National Electrical Code (NEC); in Canada, CSA C22.1) for special requirements.

It is important to recognize safety information. This is the safety-alert symbol ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

⚠ WARNING

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

Puron® (R-410A) refrigerant systems operate at higher pressures than standard R-22 systems. Do not use R-22 service equipment or components on Puron refrigerant equipment.

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in serious personal injury, death, and/or property damage.

Disconnect gas piping from unit when leak testing at pressure greater than 0.5 psig (3450 Pa). Pressures greater than 0.5 psig (3450 Pa) will cause gas valve damage resulting in hazardous condition. If gas valve is subjected to pressure greater than 0.5 psig (3450 Pa), it must be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig (3450 Pa) or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in death, serious personal injury and/or property damage.

Never use air or gases containing oxygen for leak testing or for operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in death, serious personal injury and/or property damage.

Never use non-certified refrigerants in this product. Non-certified refrigerants could contain contaminates that could lead to unsafe operating conditions. Use ONLY refrigerants that conform to AHRI Standard 700.

⚠ WARNING

UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit performance or unit shutdown.

High velocity water from a pressure washer, garden hose, or compressed air should never be used to clean a coil. The force of the water or air jet will bend the fin edges and increase airside pressure drop.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Pressing the controller's test/reset switch for longer than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

IMPORTANT: Lockout/Tagout is a term used when electrical power switches are physically locked preventing power to the unit. A placard is placed on the power switch alerting service personnel that the power is disconnected.

UNIT ARRANGEMENT AND ACCESS

General

Fig. 1 and Fig. 2 show general unit arrangement and access locations.

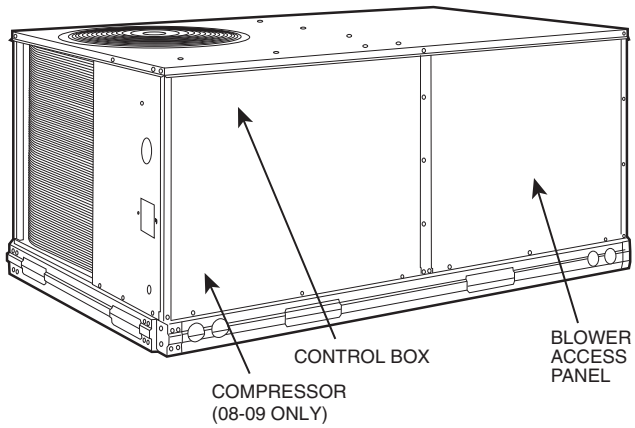


Fig. 1 — Typical Access Panel Location (Front)

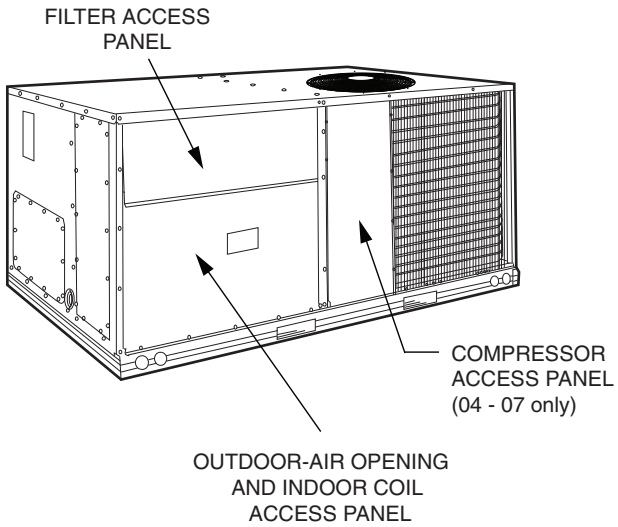


Fig. 2 — Typical Access Panel Location (Rear)

Routine Maintenance

These items should be part of a routine maintenance program, to be checked every month or two, until a specific schedule for each can be identified for this installation:

QUARTERLY INSPECTION (AND 30 DAYS AFTER INITIAL START)

- Replace return air filter
- Clean outdoor hood inlet filters
- Check belt tension
- Check belt condition
- Inspect pulley alignment
- Check fan shaft bearing locking collar tightness
- Check outdoor coil cleanliness
- Check condensate drain

Seasonal Maintenance

These items should be checked at the beginning of each season (or more often if local conditions and usage patterns dictate):

AIR CONDITIONING/HEAT PUMP

- Ensure outdoor fan motor mounting bolts are tight
- Ensure compressor mounting bolts are tight
- Inspect outdoor fan blade positioning
- Ensure control box is clean
- Check control box wiring condition
- Ensure wire terminals are tight
- Check refrigerant charge level
- Ensure indoor coils are clean
- Check supply blower motor amperage

ELECTRIC HEATING

- Inspect power wire connections
- Ensure fuses are operational
- Ensure manual-reset limit switch is closed

ECONOMIZER OR OUTSIDE AIR DAMPER

- Check inlet filters condition
- Check damper travel (economizer)
- Check gear and dampers for debris and dirt

AIR FILTERS AND SCREENS

Each unit is equipped with return air filters. If the unit has an economizer, it will also have an outside air screen. If a manual outside air damper is added, it will also have an inlet air screen.

Each of these filters and screens will need to be periodically replaced or cleaned.

RETURN AIR FILTERS

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this CAUTION can result in premature wear and damage to equipment.

DO NOT OPERATE THE UNIT WITHOUT THE RETURN AIR FILTERS IN PLACE.

Dirt and debris can collect on heat exchangers and coils possibly resulting in a small fire. Dirt buildup on components can cause excessive current used resulting in motor failure.

Return air filters are disposable fiberglass filters. Access to the filters is through the lift-out filter access panel located on the rear side of the unit, above the indoor coil access panel. See Fig. 2.

Removing the Return Air Filters

1. Grasp the bottom flange of the upper panel.
2. Lift up and swing the bottom out until the panel disengages and pulls out.
3. Reach inside and remove filters from the filter rack.
4. Replace filters as required with similar replacement filters of same size.

Re-Installing the Access Panel

1. Slide the top of the panel up under the unit top panel.
2. Slide the bottom into the side channels.
3. Push the bottom flange down until it contacts the top of the lower panel (or economizer top).

Outside Air Hood

Outside air hood inlet screens are permanent aluminum-mesh type filters. Check these for cleanliness. Remove the screens when cleaning is required. Clean by washing with hot low-pressure water and soft detergent and replace all screens before restarting the unit. Observe the flow direction arrows on the side of each filter frame.

Economizer Inlet Air Screen

This air screen is retained by filter clips under the top edge of the hood. See Fig. 3.

To remove the filter, open the filter clips. Re-install the filter by placing the frame in its track, then closing the filter clips.

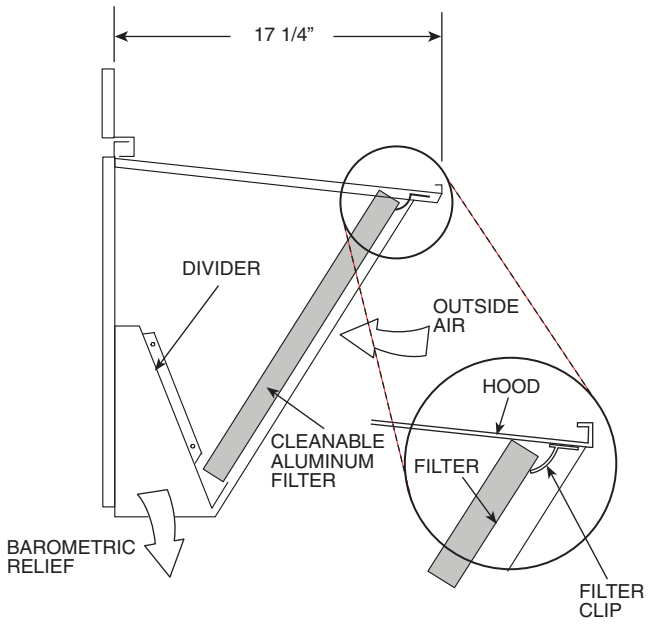


Fig. 3 — Filter Installation

Manual Outside Air Hood Screen

The Manual Outside Air Hood Screen is secured by three screws and a retainer angle across the top edge of the hood. See Fig. 4.

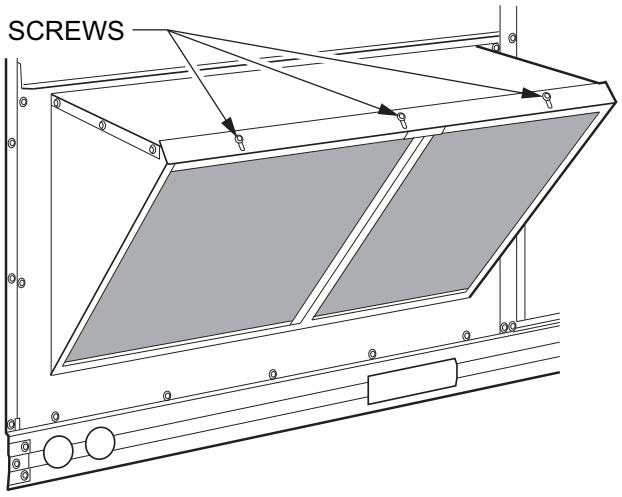


Fig. 4 — Screens Installed on Outdoor-Air Hood (Sizes A07, D08-09 Shown)

Remove the screen by loosening the three screws in the top retainer and move the retainer up until the filter can be removed.

Re-install the Manual Outside Air Hood Screen by placing the screen frame in its track, rotating the retainer back down. Tighten all screws..

SUPPLY FAN (BLOWER) SECTION

⚠ WARNING

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury or death.

Before performing service or maintenance operations on the fan system, disconnect all electrical power to the unit and apply approved Lock-out/Tagout procedures to the unit disconnect switch. Do not reach into the fan section with power applied to unit. Electrical shock and rotating equipment could cause severe injury.

Supply Fan (Direct-Drive)

For unit sizes 04, 05 and 06, a direct-drive forward-curved centrifugal blower wheel is an available option. The motor has taps to provide the servicer with the selection of one of five motor torque/speed ranges to best match wheel performance with attached duct system. See Fig. 5 and Fig. 6.

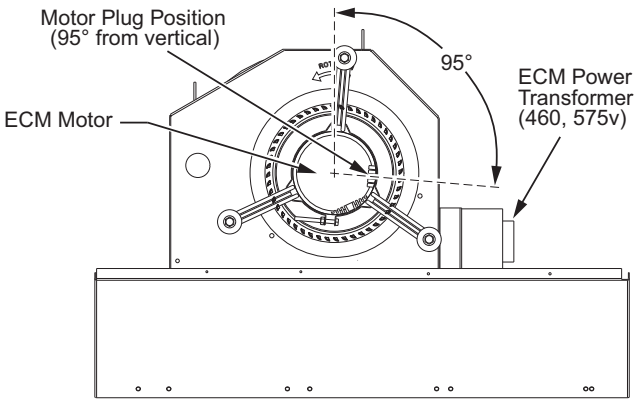


Fig. 5 — 50HCQ Direct-Drive Supply Fan Assembly

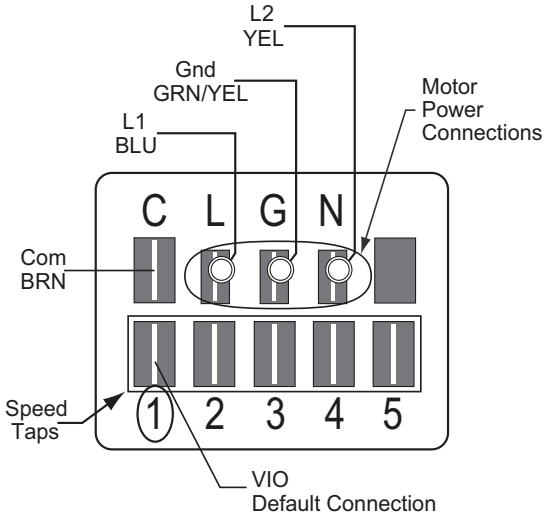


Fig. 6 — ECM Motor Connectors

ECM Motor

The direct-drive motor is an X13 Electronically Commutated Motor (ECM). An ECM motor contains electronic circuitry used to convert single-phase line AC voltage into 3-phase DC voltage to power the motor circuit. The motor circuit is a DC brushless design with a permanent magnet rotor. On the X13 ECM Motor design, the electronic circuitry is integral to the motor assembly and cannot be serviced or replaced separately.

208/230V units use a 230V motor, 460V units use a 460V motor, and 575V units use a 460V motor with an autotransformer. Motor power voltage is connected to motor terminals L and N (see Fig. 6 and Fig. 7); ground is connected at terminal G. The motor power voltage is ALWAYS present; it is not switched off by a motor contactor.

Motor operation is initiated by the presence of a 24V control signal to one of the five motor communications terminals. When the 24V signal is removed, the motor will stop. The motor control signal is switched by the defrost board's IFO output.

EVALUATING MOTOR SPEED

The X13 ECM Motor uses a constant torque motor design. The motor speed is adjusted by the motor control circuitry to maintain the programmed shaft torque. Consequently there is no specific speed value assigned to each control tap setting. At the Position 5 tap, the motor speed is approximately 1050 RPM (17.5 r/s) but varies depending on fan wheel loading.

SELECTING SPEED TAP

The five communication terminals are each programmed to provide a different motor torque output. See Table 1. Factory default tap selection is Position 1 for lowest torque/speed operation.

Table 1 — 50HCQ Motor Tap Programing (percent of full-load torque)

UNIT SIZE	TAP 1	TAP 2	TAP 3	TAP 4	TAP 5
04	29	33	41	48	100
05	46	49	57	67	100
06	49	55	79	90	100

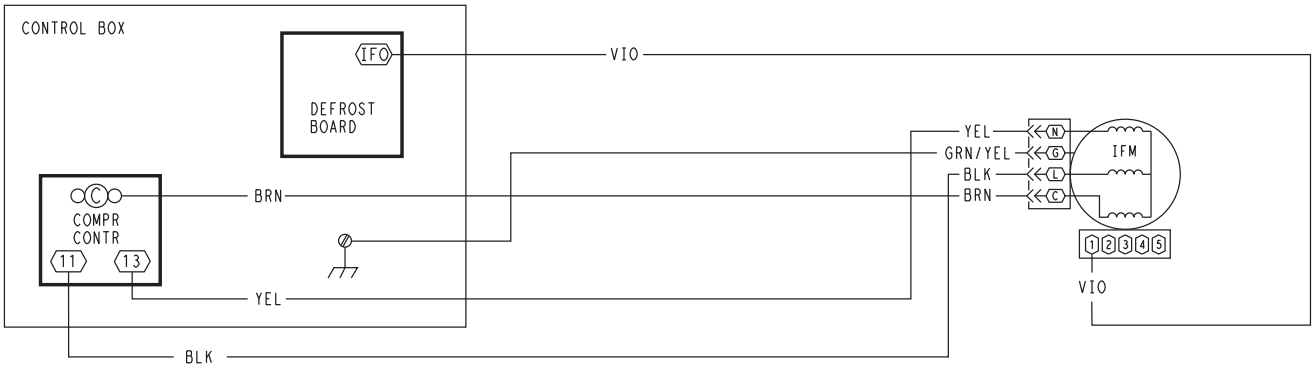
Factory Default: Tap 1 (VIO)

SELECTING ANOTHER SPEED:

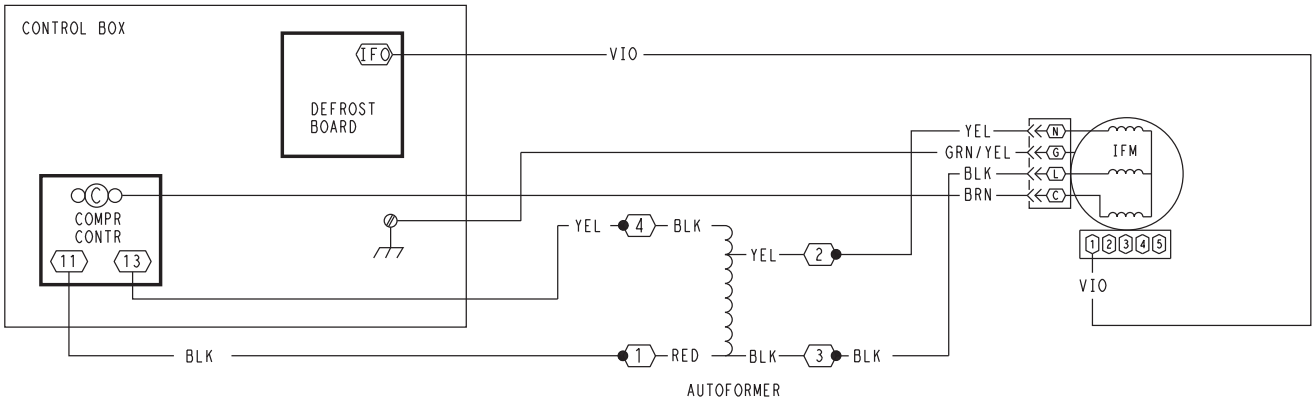
1. Disconnect main power to the unit. Apply lockout/tagout procedures.
2. Remove the default motor signal lead (VIO) from terminal 1 at the motor communications terminal.
3. Reconnect the motor signal lead to the desired speed (terminals 1 through 5).
4. Connect main power to the unit.

MOTOR "ROCKING" ON START-UP

When the motor first starts, the rotor (and attached wheel) will "rock" back and forth as the motor tests for rotational direction. Once the correct rotational direction is determined by the motor circuitry, the motor will ramp up to the specified speed. The "rocking" is a normal operating characteristic of ECM motors.



208/230, 460-v Units



575-v Units

Fig. 7 — ECM Unit Wiring

TROUBLESHOOTING THE ECM MOTOR

Troubleshooting the X13 ECM requires a voltmeter.

1. Disconnect main power to the unit.
2. Remove the motor power plug (including the control BRN lead) and VIO control signal lead at the motor terminals.
3. Restore main unit power.
4. Check for proper line voltage at motor power leads BLK (at L terminal) and YEL (at N terminal). See Table 2.

Table 2 — Motor Test Volts

Unit Voltage	Motor Voltage	Min-Max Volts
208/230	230	187-253
460	460	414-506
575	460	414-506

5. Using a jumper wire from unit control terminals R to G, engage motor operation. Check for 24v output at the defrost board terminal IFO.
6. Check for proper control signal voltages of 22V to 28V at motor signal leads VIO and BRN.
7. Disconnect unit main power. Apply lockout/tagout procedures.
8. Reconnect motor power and control signal leads at the motor terminals.
9. Restore unit main power.
10. The motor should start and run. If the motor does not start, remove the motor assembly. Replace the motor with one having the same part number. Do not substitute with an alternate design motor as the torque/speed programming will not be the same as that on an original factory motor.

REPLACING THE X-13 ECM MOTOR

Before removing the ECM belly-band mounting ring from old motor:

1. Measure the distance from base of the motor shaft to the edge of the mounting ring.
2. Remove the motor mounting band and transfer it to the replacement motor.
3. Position the mounting band at the same distance that was measured in Step 1.
4. Hand-tighten mounting bolt only. Do not tighten securely at this time.
5. Insert the motor shaft into the fan wheel hub.
6. Securely tighten the three motor mount arms to the support cushions and torque the arm mounting screws to 60 in.-lbs (6.8 Nm).
7. Center the fan wheel in the fan housing. Tighten the fan wheel hub setscrew and torque to 120 in.-lbs (13.6 Nm).
8. Ensure the motor terminals are located at a position below the 3 o'clock position (see Fig. 5). Tighten the motor belly-band bolt and torque to 80 in.-lbs (9.0 Nm).

Supply Fan (Belt-Drive)

The belt-drive supply fan system consists of a forward-curved centrifugal blower wheel on a solid shaft with two concentric type bearings, one on each side of the blower housing. A fixed-pitch driven pulley is attached to the fan shaft and an adjustable-pitch driver pulley is on the motor. The pulleys are connected using a V-belt. See Fig. 8.

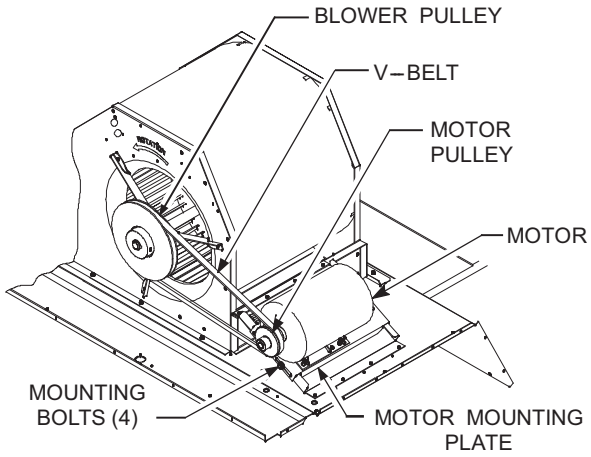


Fig. 8 — Typical Belt Drive Motor Mounting

Variable Frequency Drive (VFD)

For units equipped with a VFD factory installed option (FIOP), refer to the following supplement: "Variable Frequency Drive (VFD) Installation, Setup and Troubleshooting."

Belt

Check the belt condition and tension quarterly. Inspect the belt for signs of cracking, fraying, or glazing along the inside surfaces. Check belt tension by using a spring-force tool, such as Browning's "Belt Tension Checker" (P/N: 1302546) or equivalent tool; tension should be 6 lbs at a $^{5}/_{8}$-in. (1.6 cm) deflection when measured at the centerline of the belt span. This point is at the center of the belt when measuring the distance between the motor shaft and the blower shaft.

NOTE: Without the spring-tension tool, place a straight edge across the belt surface at the pulleys, then push down on the belt at mid-span using one finger until a $^{1}/_{2}$-in. (1.3 cm) deflection is reached. See Fig. 9.

Adjust belt tension by loosening the motor mounting plate front and rear bolts and sliding the plate toward the fan (to reduce tension) or away from fan (to increase tension). Ensure the blower shaft and the motor shaft are parallel to each other (pulleys aligned). When finished, tighten all bolts and torque to 65 to 70 in.-lb (7.4 to 7.9 Nm).

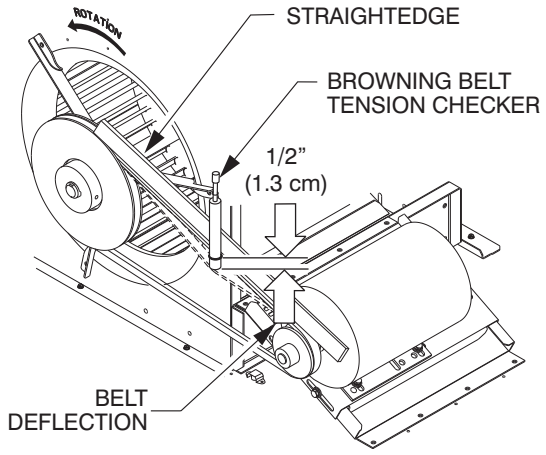


Fig. 9 — Checking Blower Motor Belt Tension

REPLACING THE BELT

NOTE: Use a belt with same section type or similar size. Do not substitute an FHP-type belt. When installing the new belt, do not use a tool (screwdriver or pry bar) to force the belt over the pulley flanges; this will stress the belt and cause a reduction in belt life. Damage to the pulley can also occur.

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this CAUTION can result in premature wear and damage to equipment.

Do not use a screwdriver or a pry bar to place the new V-belt in the pulley groove. This can cause stress on the V-belt and the pulley resulting in premature wear on the V-belt and damage to the pulley.

Use the following steps to replace the V-belt. See Fig. 8.

1. Loosen the front and rear motor mounting plate bolts.
2. Push the motor and its mounting plate towards the blower housing as close as possible to reduce the center distance between fan shaft and motor shaft.
3. Remove the belt by gently lifting the old belt over one of the pulleys.
4. Install the new belt by gently sliding the belt over both pulleys and then sliding the motor and plate away from the fan housing until proper tension is achieved.
5. Check the alignment of the pulleys; adjust if necessary.
6. Tighten all bolts and torque to 65 to 70 in.-lb (7.4 to 7.9 Nm).
7. Check the tension after a few hours of runtime and readjust as required.

Adjustable-Pitch Pulley on Motor

The motor pulley is an adjustable-pitch type that allows a servicer to implement changes in the fan wheel speed to match as-installed ductwork systems. The pulley consists of a fixed flange side that faces the motor (secured to the motor shaft) and a movable flange side that can be rotated around the fixed flange side that increases or reduces the pitch diameter of this driver pulley. See Fig. 10.

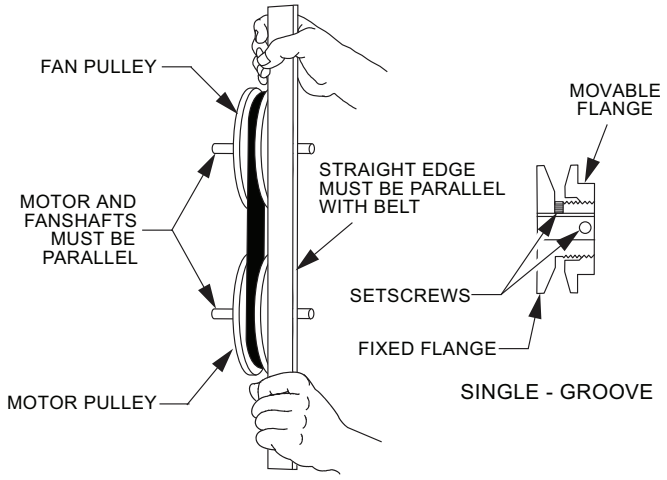


Fig. 10 — Supply-Fan Pulley Adjustment

As the pitch diameter is changed by adjusting the position of the movable flange, the centerline on this pulley shifts laterally (along the motor shaft). This creates a requirement for a realignment of the pulleys after any adjustment of the movable flange. Reset the belt tension after each realignment.

Inspect the condition of the motor pulley for signs of wear. Glazing of the belt contact surfaces and erosion on these surfaces are signs of improper belt tension and/or belt slippage. Replace pulley if wear is excessive.

Changing the Fan Speed

1. Shut off unit power supply. Use proper lockout/tagout procedures.
2. Loosen belt by loosening fan motor mounting nuts. See Fig. 8.
3. Loosen movable pulley flange setscrew. See Fig. 10.
4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed the maximum specified speed.
5. Set movable flange at nearest keyway of pulley hub. Tighten setscrew and torque to 65 to 70 in.-lb (7.4 to 7.9 Nm).

Aligning Blower and Motor Pulleys

1. Loosen blower pulley setscrews.
2. Slide blower pulley along blower shaft. Make angular alignment by loosening motor mounting plate front and rear bolts.
3. Tighten blower pulley setscrews and motor mounting bolts. Torque bolts to 65 to 70 in.-lb (7.4 to 7.9 Nm).
4. Recheck belt tension.

Bearings

The fan system uses bearings featuring concentric split locking collars. A Torx[1] T-25 socket head cap screw is used to tighten the locking collars. Tighten the locking collar by holding it tightly against the inner race of the bearing. Tighten the socket head cap screw. Torque cap screw to 55 to 60 in.-lb (6.2 to 6.8 Nm). See Fig. 11. Check the condition of the motor pulley for signs of wear. Glazing of the belt contact surfaces and erosion on these surfaces are signs of improper belt tension and/or belt slippage. Pulley replacement can be necessary.

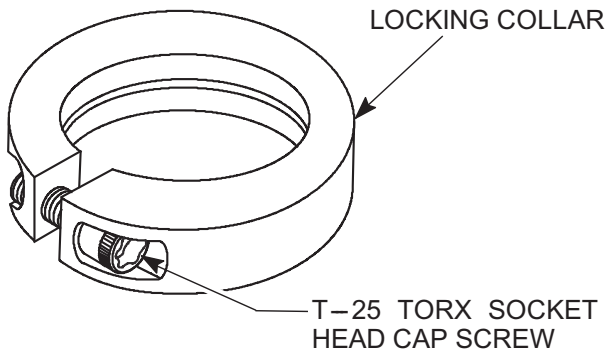


Fig. 11 — Tightening Locking Collar

MOTOR

When replacing the motor, also replace the external-tooth lock washer (star washer) under the motor mounting base; this is part of the motor grounding system. Ensure the teeth on the lock washer are in contact with the motor's painted base. Tighten motor mounting bolts and torque to 120 ± 12 in.-lbs (14 ± 1.4 Nm).

Change fan wheel speed by changing the fan pulley (larger pitch diameter to reduce wheel speed, smaller pitch diameter to increase wheel speed) or select a new system (both pulleys and matching belt). The horsepower rating of the belt is primarily dictated by the pitch diameter of the smaller pulley in the drive system (typically the motor pulley in these units). Do not install a replacement motor pulley with a smaller pitch diameter than was provided on the original factory pulley.

Before changing pulleys to increase fan wheel speed, check the fan performance at the target speed and airflow rate to determine new motor loading (bhp). Use the fan performance tables or use the Packaged Rooftop Builder software program. Confirm that the motor in this unit is capable of operating at the new operating condition. Fan shaft loading increases dramatically as wheel speed is increased.

To reduce vibration, replace the motor's adjustable pitch pulley with a fixed pitch pulley (after the final airflow balance adjustment). This will reduce the amount of vibration generated by the motor/belt-drive system.

HEAT PUMP REFRIGERATION SYSTEM

⚠WARNING

UNIT OPERATION AND SAFETY HAZARD

Failure to follow this warning could cause personal injury, death and/or equipment damage.

This system uses Puron® refrigerant which has higher pressures than R-22 and other refrigerants. No other refrigerant may be used in this system. Gage set, hoses, and recovery system must be designed to handle Puron refrigerant. If unsure about equipment, consult the equipment manufacturer.

Outdoor Coil

The 50HCQ outdoor coil is fabricated with round tube copper hairpins and plate fins of various materials and/or coatings (see "Appendix I — Model Number Significance" to identify the materials provided in this unit). All unit sizes use composite-type two-row coils. Composite two-row coils are two single-row coils fabricated with a single return bend end tubesheet.

Indoor Coil

The indoor coil is traditional round-tube, plate-fin technology. Tube and fin construction is of various optional materials and coatings (see Appendix A — Model Number Nomenclature on page 39). Coils are multiple-row.

Recommended Outdoor Coil Maintenance and Cleaning

Routine cleaning of coil surfaces is essential to maintain proper operation of the unit. Elimination of contamination and removal of harmful residues will greatly increase the life of the coil and extend the life of the unit. The following maintenance and cleaning procedures are recommended as part of the routine maintenance activities to extend the life of the coil.

REMOVE SURFACE LOADED FIBERS

Surface loaded fibers or dirt should be removed with a vacuum cleaner. If a vacuum cleaner is not available, a soft non-metallic bristle brush may be used. In either case, the tool should be applied in the direction of the fins. Coil surfaces can be easily damaged (fin edges can be easily bent over and damage to the coating of a protected coil) if the tool is applied across the fins.

NOTE: Use of a water stream, such as a garden hose, against a surface loaded coil will drive the fibers and dirt into the coil. This will make cleaning efforts more difficult. Surface loaded fibers must be completely removed prior to using low velocity clean water rinse.

PERIODIC CLEAN WATER RINSE

A periodic clean water rinse is very beneficial for coils that are applied in coastal or industrial environments. However, it is very important that the water rinse is made with a very low velocity water stream to avoid damaging the fin edges. Monthly cleaning as described below is recommended.

⚠CAUTION

Ensure clearances are in accordance with local installation codes, the requirements of the gas supplier and the manufacturer's installation Instructions.

1. Torx is a registered trademark of Acument Intellectual Properties LLC.

ROUTINE CLEANING OF INDOOR COIL SURFACES

Periodic cleaning with Totaline® environmentally sound coil cleaner is essential to extend the life of coils. This cleaner is available from Replacement Components Division as part number P902-0301 for a one gallon (3.8L) container, and part number P902-0305 for a 5 gallon (19L) container. It is recommended that all coils, including standard aluminum, pre-coated, copper/copper or e-coated coils be cleaned with the Totaline environmentally sound coil cleaner as described below. Coil cleaning should be part of the unit's regularly scheduled maintenance procedures to ensure long life of the coil. Failure to clean the coils may result in reduced durability in the environment.

Avoid use of:

- coil brighteners
- acid cleaning prior to painting
- high pressure washers
- poor quality water for cleaning

Totaline environmentally sound coil cleaner is nonflammable, hypoallergenic, non-bacterial, and a USDA accepted biodegradable agent that will not harm the coil or surrounding components such as electrical wiring, painted metal surfaces, or insulation. Use of non-recommended coil cleaners is strongly discouraged since coil and unit durability could be affected.

CLEAN COIL AS FOLLOWS

1. Turn off unit power. Use lockout/tagout procedures on unit power switch.
2. Remove top panel screws on outdoor coil end of unit.
3. Remove coil corner post. See Fig. 12. To hold top panel open, place coil corner post between top panel and center post. See Fig. 13.

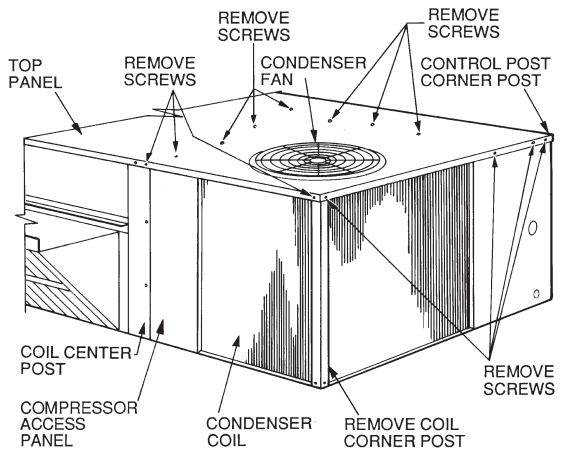


Fig. 12 — Cleaning Condenser Coil (Size 04-06 shown)

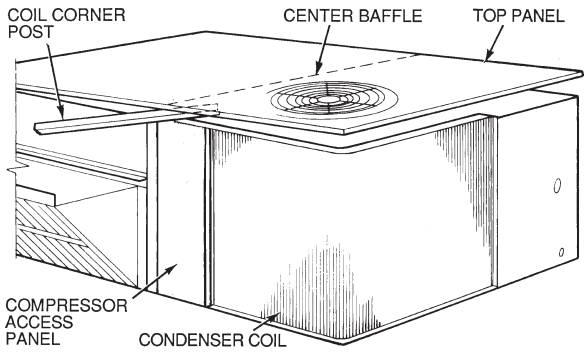


Fig. 13 — Propping Up Top Panel

4. For Sizes 04-06: Remove screws securing coil to compressor plate and compressor access panel.
5. For Sizes 07-12: Remove fastener holding coil sections together at return end of condenser coil. Carefully separate the outdoor coil section 3 to 4 in. (7.6 to 10 cm) from the inner coil section. See Fig. 14.

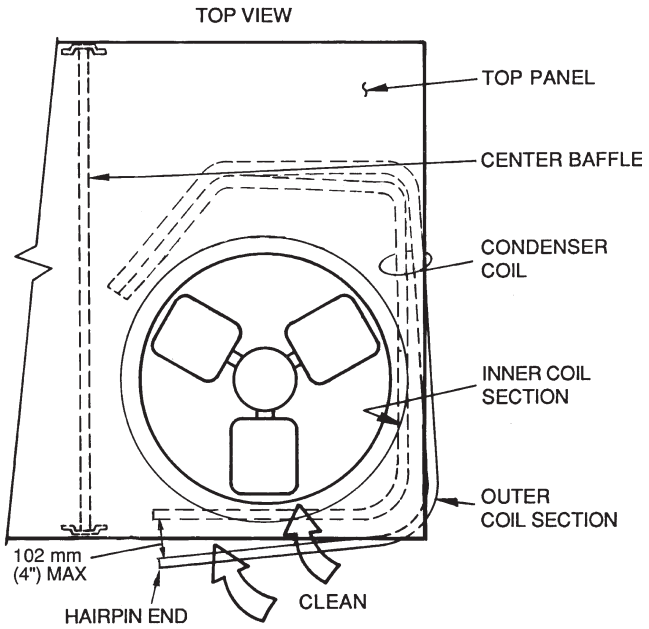


Fig. 14 — Separating Coil Sections

6. Clean the outer surfaces with a stiff brush in the normal manner. Use a water hose or other suitable equipment to flush down between the 2 coil sections to remove dirt and debris.
7. Secure inner and outer coil rows together with a field-supplied fastener.
8. Reposition the outer coil section and remove the coil corner post from between the top panel and center post. Reinstall the coil corner post and replace all screws.

TOTALINE ENVIRONMENTALLY SOUND COIL CLEANER APPLICATION EQUIPMENT

- 2.5 gal (9.5 L) garden sprayer
- Water rinse with low velocity spray nozzle

⚠ WARNING

UNIT DAMAGE HAZARD

Failure to follow this caution may result in reduced unit performance or unit shutdown.

High velocity water from a pressure washer, garden hose, or compressed air should never be used to clean a coil. The force of the water or air jet will bend the fin edges and increase airside pressure drop.

⚠ CAUTION

UNIT DAMAGE HAZARD

Failure to follow this caution may result in accelerated corrosion of unit parts.

Harsh chemicals, household bleach or acid or basic cleaners should not be used to clean outdoor or indoor coils of any kind. These cleaners can be very difficult to rinse out of the coil and can accelerate corrosion at the fin/tube interface where dissimilar materials are in contact. If there is dirt below the surface of the coil, use the Totaline environmentally sound coil cleaner.

TOTALINE ENVIRONMENTALLY SOUND COIL CLEANER APPLICATION INSTRUCTIONS

1. Proper protection equipment, such as approved safety glasses and gloves, is recommended during mixing and application.
2. Remove all surface loaded fibers and debris using a vacuum cleaner or a soft non-metallic bristle brush as described above.
3. Thoroughly wet finned surfaces with clean water and a low velocity garden hose, being careful not to bend fins.
4. Mix Totaline environmentally sound coil cleaner in a 2.5 gal (9.5 L) garden sprayer according to the instructions included with the cleaner. The optimum solution temperature is 100° F (38° C).

   NOTE: DO NOT USE water in excess of 130° F (54° C), as the enzymatic activity will be destroyed.

1. Thoroughly apply Totaline environmentally sound coil cleaner solution to all coil surfaces including finned area, tube sheets and coil headers.
2. Hold garden sprayer nozzle close to finned areas and apply cleaner with a vertical, up-and-down motion. Avoid spraying in horizontal pattern to minimize potential for fin damage.
3. Ensure cleaner thoroughly penetrates deep into finned areas. Interior and exterior finned areas must be thoroughly cleaned. Finned surfaces should remain wet with cleaning solution for 10 minutes. Ensure surfaces are not allowed to dry before rinsing. Reapply cleaner as needed to ensure 10-minute saturation is achieved.
4. Thoroughly rinse all surfaces with low velocity clean water using downward rinsing motion of water spray nozzle. Protect fins from damage from the spray nozzle.

Indoor Coil

CLEANING THE INDOOR COIL

1. Turn unit power off. Use proper lockout/tagout procedures.
2. Remove indoor coil access panel.
3. If economizer or two-position damper is installed, remove economizer by disconnecting the Molex[1] plug and removing mounting screws.
4. Slide filters out of unit.
5. Clean coil using a commercial coil cleaner or dishwasher detergent in a pressurized spray canister. Wash both sides of coil and flush with clean water. For best results, backflush toward return-air section to remove foreign material. Flush condensate pan after completion.
6. Reinstall economizer and filters.
7. Reconnect wiring.
8. Replace access panels.

1. Molex is a registered trademark of Molex Inc.

Refrigeration System Components

Each heat pump refrigeration system includes a compressor, accumulator, reversing valve, dual-function outdoor coil with vapor header check valve, cooling liquid line with a filter drier and a check valve, dual-function indoor coil with a vapor header check valve, and heating liquid line with check a valve and a strainer. Unit sizes A04-A/D07 have a single compressor-circuit; unit sizes D08-D12 have two compressor-circuits. See Fig. 15 for typical unit piping schematic (unit size D09 (4-row indoor coil) with two compressor-circuits is shown).

Dual-function outdoor and indoor coils are designed to provide parallel coil circuits during evaporator-function operation and converging coil circuits during the condenser-function operation.

Reversing Valve and Check Valve Position

See Fig.15.

Troubleshooting Refrigerant Pressure Problems and Check Valves

Refer to Fig. 15 and the Cooling, Heating, and Defrost Mode Tables 3-5).

Table 3 — Cooling Mode (each circuit)

COMPONENT	STATUS/POSITION
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Closed
Check Valve D	Open

Table 4 — Heating Mode (each circuit)

COMPONENT	STATUS/POSITION
Reversing Valve	De-energized
Check Valve A	Open
Check Valve B	Closed
Check Valve C	Open
Check Valve D	Closed

Table 5 — Defrost Mode (A04-A/D07 and D08-D12/Circuit 2:)

COMPONENT	STATUS/POSITION
Defrost Thermostat	Closed
Outdoor Fan(s)	Off
Reversing Valve	Energized
Check Valve A	Closed
Check Valve B	Open
Check Valve C	Closed
Check Valve D	Open

Refrigerant System Pressure Access Ports

There are two access ports in each circuit - on the suction tube and the discharge tube near the compressor. These are brass fittings with black plastic caps. The hose connection fittings are standard $^1/_4$ SAE male flare couplings.

The brass fittings are two-piece High Flow valves, with a receptacle base brazed to the tubing and an integral spring-closed check valve core screwed into the base. See Fig. 16. This check valve is permanently assembled into this core body and cannot be serviced separately. Replace the entire core body if necessary. Service tools are available from RCD that allow the replacement of the check valve core without having to recover the entire system refrigerant charge. Apply compressor refrigerant oil to the check valve core's bottom O-ring. Install the fitting body and torque to 96±10 in.-lbs (10.9 ± 1 Nm). Do not exceed 106 in.-lbs (11.9 Nm) when tightening.

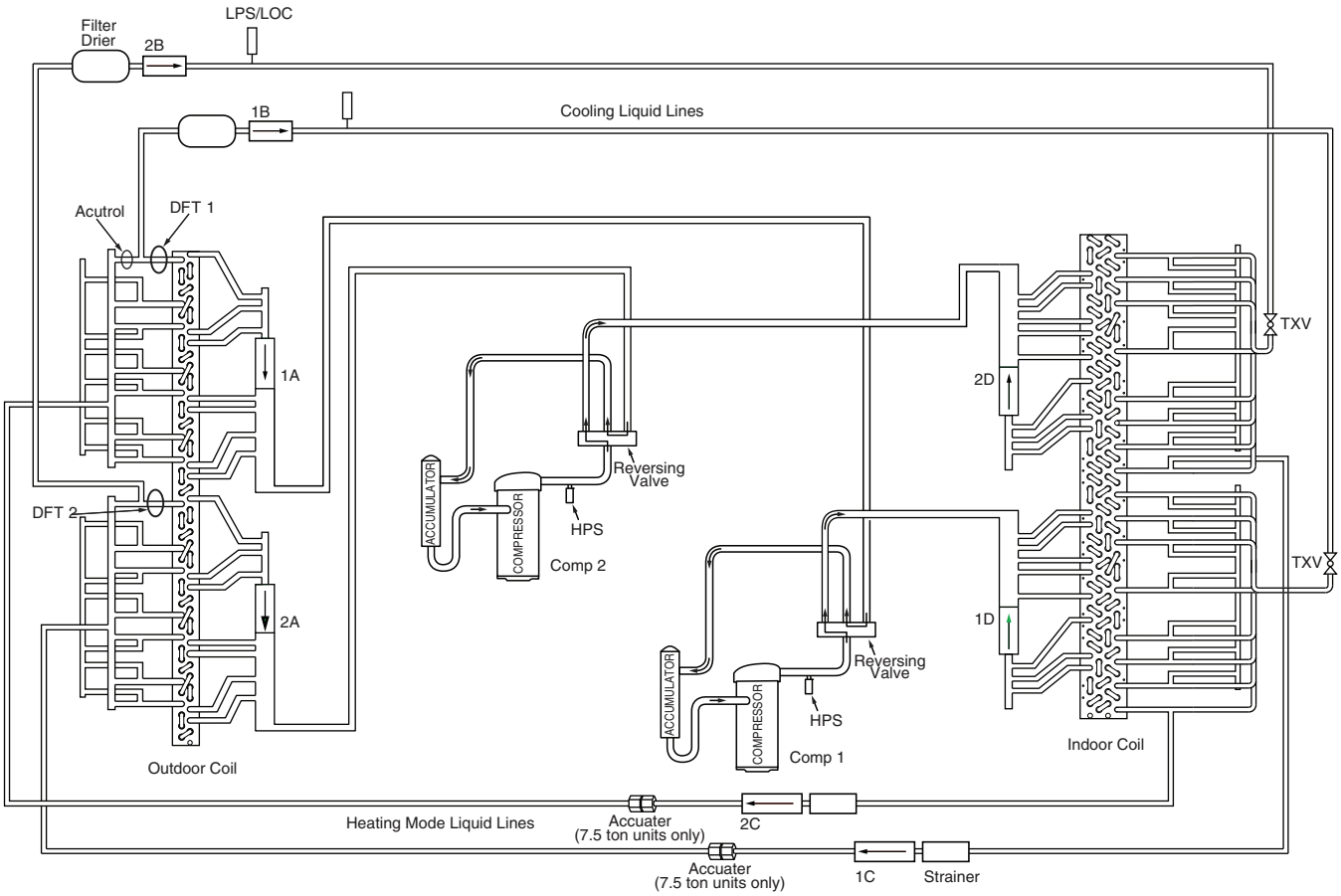


Fig. 15 — Typical Unit Piping Schematic (50HCQ08, 09 Shown)

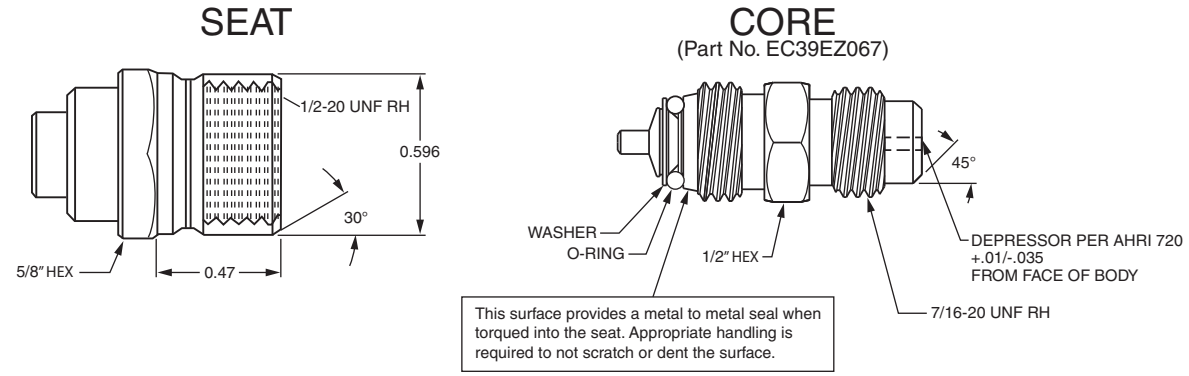


Fig. 16 — CoreMax[1] Access Port Assembly

PURON® (R-410A) REFRIGERANT

This unit is designed for use with Puron (R-410A) refrigerant. Do not use any other refrigerant in this system.

Puron (R-410A) refrigerant is provided in pink (rose) colored cylinders. These cylinders are available with and without dip tubes; cylinders with dip tubes will have a label indicating this feature. For a cylinder with a dip tube, place the cylinder in the upright position (access valve at the top) when removing liquid refrigerant for charging. For a cylinder without a dip tube, invert the cylinder (access valve on the bottom) when removing liquid refrigerant.

Because Puron (R-410A) refrigerant is a blend, it is strongly recommended that refrigerant always be removed from the cylinder as a liquid. Admit liquid refrigerant into the system in the discharge line. If adding refrigerant into the suction line, use a commercial metering/expansion device at the gage manifold; remove liquid from the cylinder, pass it through the metering device at the gage set and then pass it into the suction line as a vapor. Do not remove Puron (R-410A) refrigerant from the cylinder as a vapor.

Refrigerant Charge

The amount of refrigerant charge is listed on the unit's nameplate. Refer to Carrier GTAC2-5 Charging, Recovery, Recycling and Reclamation training manual and the following procedures.

Unit panels must be in place when unit is operating during the charging procedure. If unit is equipped with a head pressure control device, bypass it to ensure full fan operation during charging.

Charge checking and adjustments must be made while the system is operating in Cooling only.

1. CoreMax is a registered trademark of Fastest, Inc.

NO CHARGE

Use standard evacuating techniques for Puron (R-410A) refrigerant. After evacuating system, weigh in the specified amount of refrigerant.

THERMOSTATIC EXPANSION VALVE (TXV)

All 50HCQs have a factory-installed nonadjustable thermostatic expansion valve (TXV). The TXV will be a bi-flow, bleed port expansion valve with an external equalizer. TXVs are specifically designed to operate with Puron® or R-22 refrigerant. Use only factory-authorized TXVs. See Fig. 15 for a typical piping schematic.

TXV Operation

The TXV is a metering device that is used in air conditioning and heat pump systems to adjust to changing load conditions by maintaining a preset superheat temperature at the outlet of the evaporator coil.

The volume of refrigerant metered through the valve seat is dependent upon the following (see Fig. 17 and 18):

1. Superheat temperature is sensed by cap tube sensing bulb on suction tube at outlet of evaporator coil. This temperature is converted into pressure by refrigerant in the bulb pushing downward on the diaphragm which opens the valve using the push rods. As long as this bulb and cap tube contain any liquid refrigerant, this temperature is converted into suction pressure pushing downward on the diaphragm, which tends to open the TXV valve through the push rods.
2. The suction pressure at the outlet of the evaporator coil is transferred through the external equalizer tube to the underside of the diaphragm.
3. The needle valve on the pin carrier is spring loaded, exerting pressure on the underside of the diaphragm. Therefore, the bulb pressure equals evaporator pressure (at outlet of coil) plus spring pressure. If the load increases, the temperature increases at the bulb, which increases the pressure on the top side of the diaphragm, pushing the carrier away from the seat, opening the valve and increasing the flow of refrigerant. The increased refrigerant flow causes increased leaving evaporator pressure which is transferred through the equalizer tube to the underside of the diaphragm. This causes pin carrier spring pressure to close the TXV valve. The refrigerant flow is effectively stabilized to the load demand with a negligible change in superheat.

Replacing TXV

⚠ CAUTION

PERSONAL INJURY HAZARD

Failure to follow this caution can result in injury to personnel and damage to components.

Always wear approved safety glasses, work gloves, and other recommended Personal Protective Equipment (PPE) when working with refrigerants.

1. Recover refrigerant.
2. Remove TXV support clamp using a $^{5}/_{16}$-in. nut driver.
3. Remove TXV using a wrench and an additional wrench on connections to prevent damage to tubing.
4. Remove equalizer tube from suction line of coil. Use file or tubing cutter to cut brazed equalizer line approximately 2 inches above suction tube.
5. Remove bulb from vapor tube inside cabinet.
6. Install the new TXV using a wrench and an additional wrench on connections to prevent damage to tubing while attaching TXV to distributor.
7. Attach the equalizer tube to the suction line. If the coil has a mechanical connection, then use a wrench and an additional wrench on connections to prevent damage. If the coil has a brazed connection, use a file or a tubing cutter to remove the mechanical flare nut from the equalizer line. Then use a new coupling to braze the equalizer line to the stub (previous equalizer line) in suction line.
8. Attach TXV bulb in the same location (in the sensing bulb indent) where the original was when it was removed, using the supplied bulb clamps. See Fig. 19.
9. Route equalizer tube through suction connection opening (large hole) in fitting panel and install fitting panel in place.
10. Sweat the inlet of TXV marked “IN” to the liquid line. Avoid excessive heat which could damage the TXV valve. Use quenching cloth when applying heat anywhere on TXV.

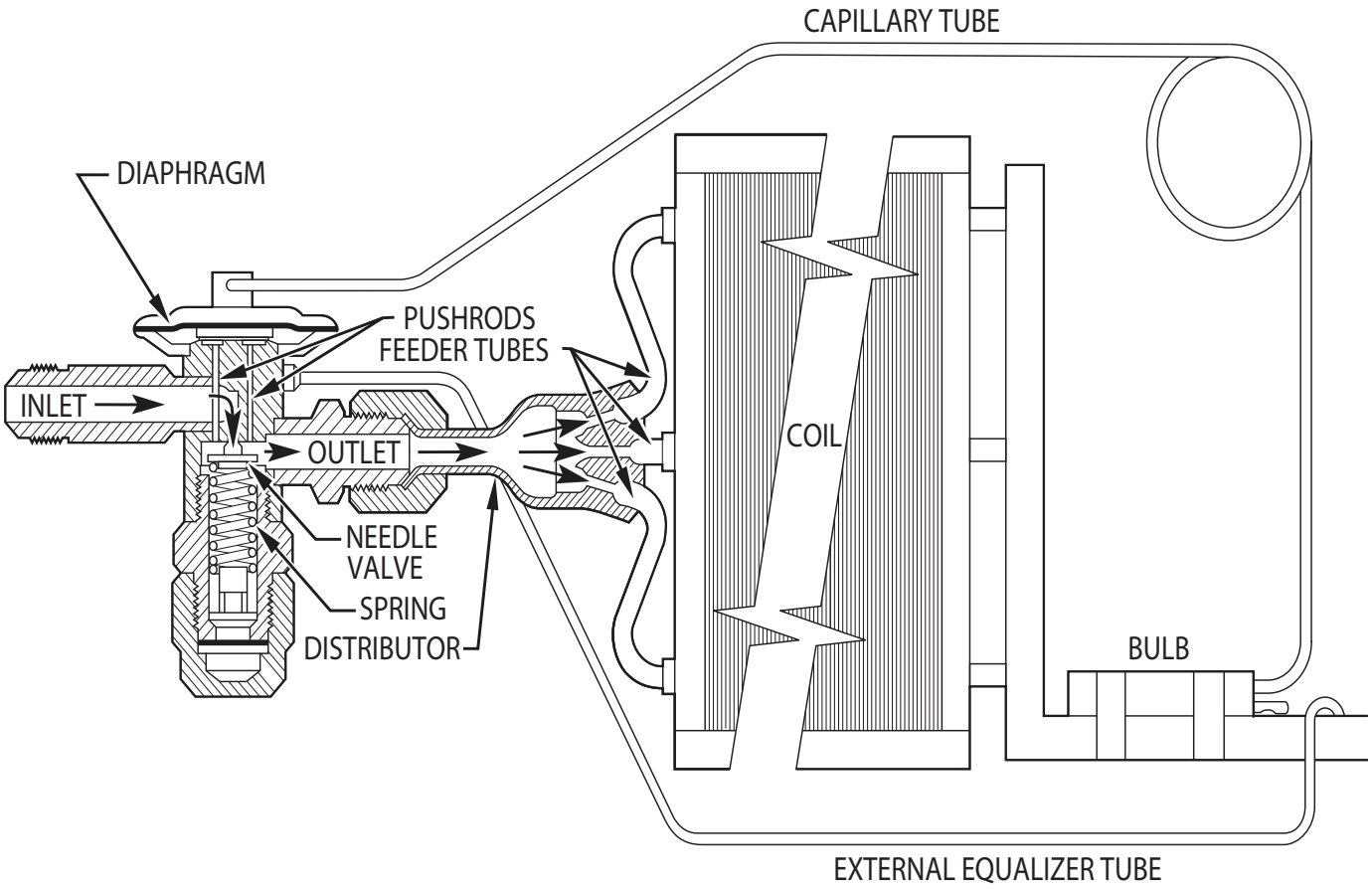


Fig. 17 — Thermostatic Expansion Valve (TXV) Operation

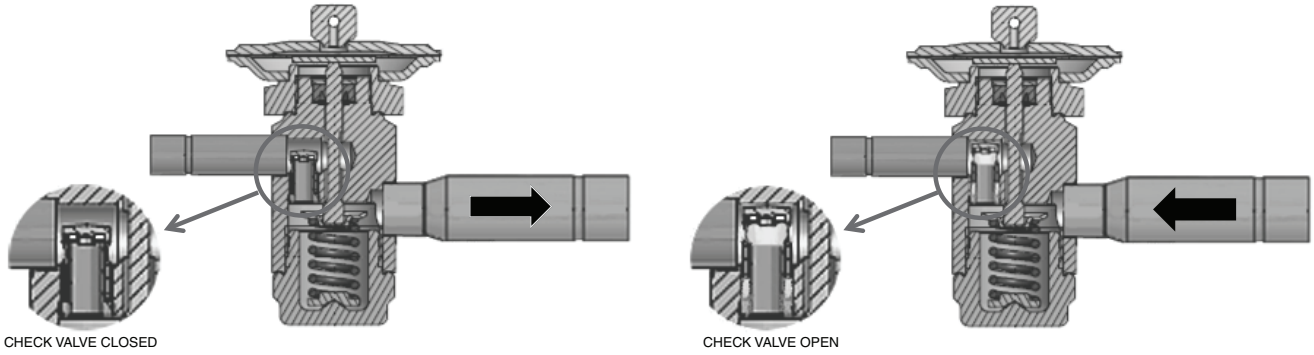
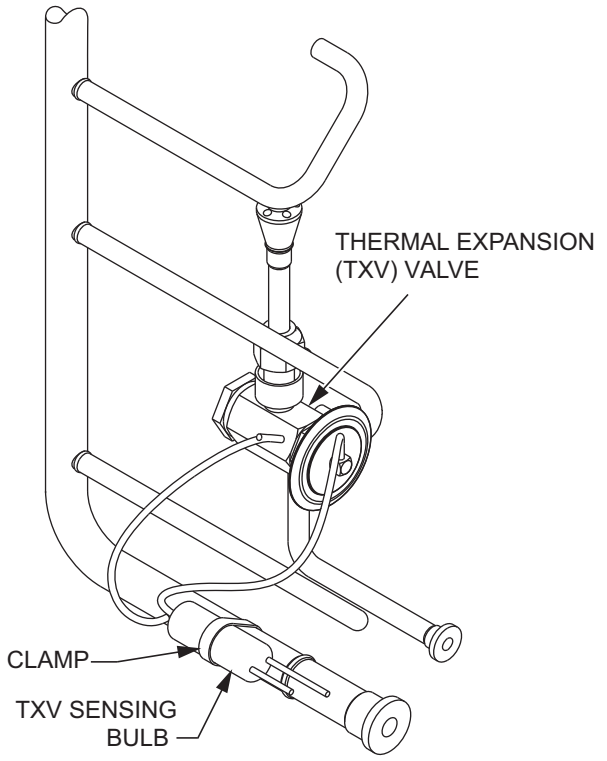


Fig. 18 — Thermostatic Expansion Valve (TXV) with Bypass



SENSING BULB INSULATION REMOVED FOR CLARITY

Fig. 19 — TXV Valve and Sensing Bulb

COOLING CHARGING CHARTS

How To Use Cooling Charging Charts

Take the outdoor ambient temperature and read the suction pressure gauge. Refer to chart to determine what suction temperature should be. If suction temperature is high, add refrigerant. If suction temperature is low, carefully recover some of the charge. Recheck the suction pressure as charge is adjusted.

SIZE DESIGNATION	NOMINAL TONS REFERENCE
A04	3.0
A05	4.0
A06	5.0
A07	6.0
D07	6.0
D08	7.5
D09	8.5
D12	10.0

EXAMPLE:

50HCQD12

Outdoor Temperature . . . . . 85° F (29° C)

Suction Pressure . . . . . 140 psig (965 kPa)

Suction Temperature should be . . . . . 55° F (13° C)

Refer to Fig. 20-28 for Cooling Charging Charts.

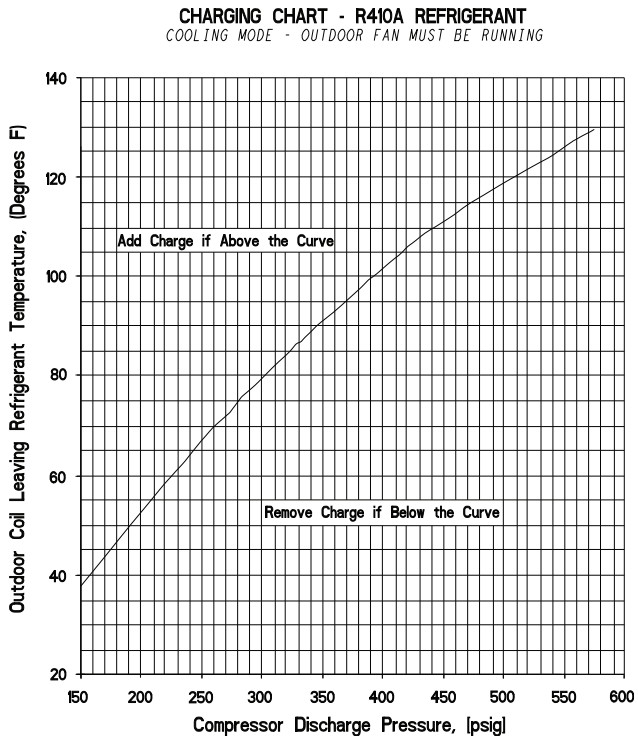


Fig. 20 — Cooling Charging Chart — 50HCQA04

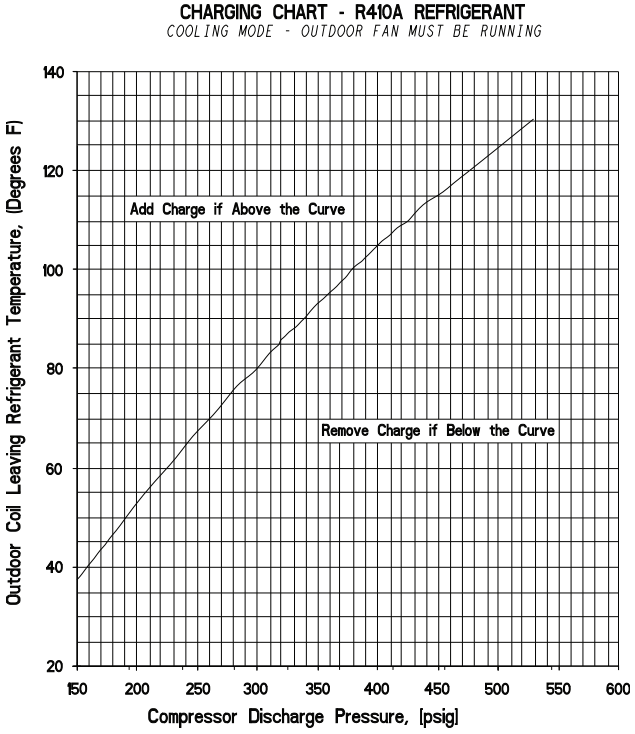


Fig. 21 — Cooling Charging Chart — 50HCQA05

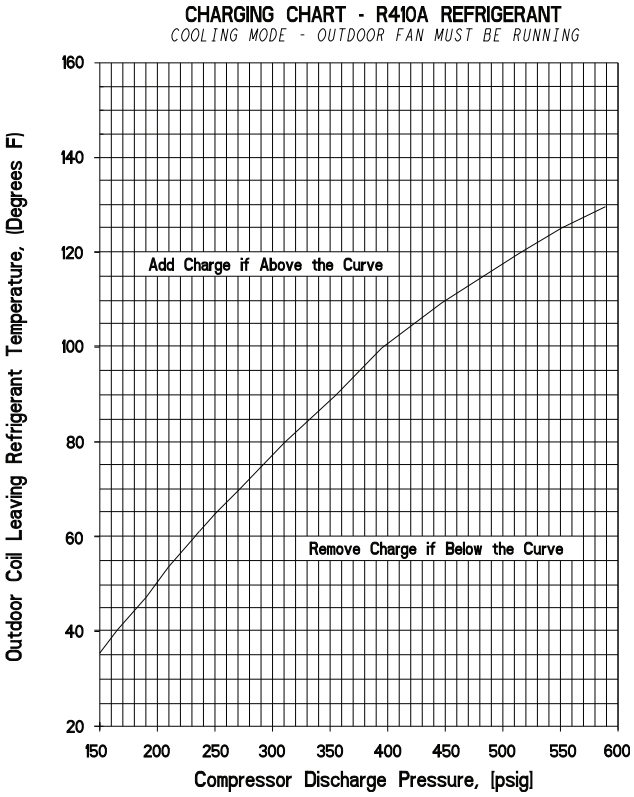


Fig. 22 — Cooling Charging Chart — 50HCQA06

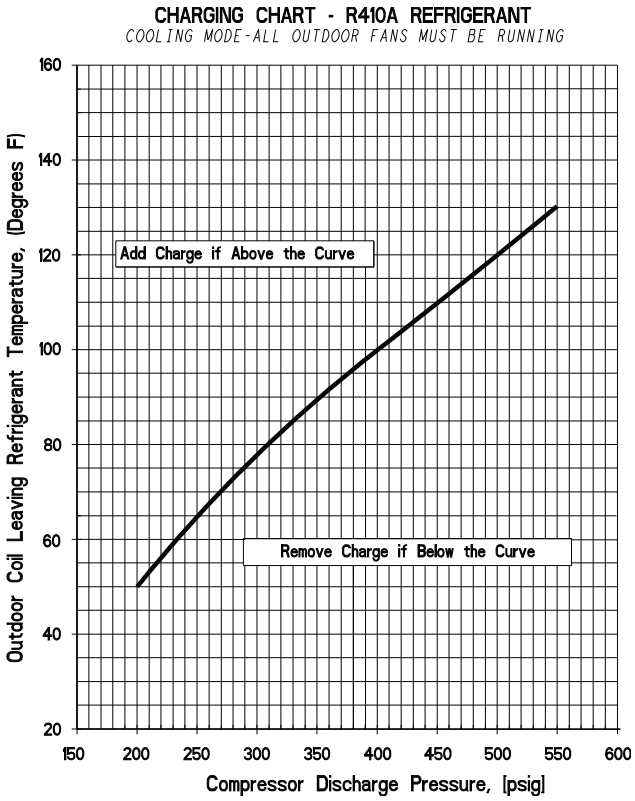


Fig. 23 — Cooling Charging Chart — 50HCQA07

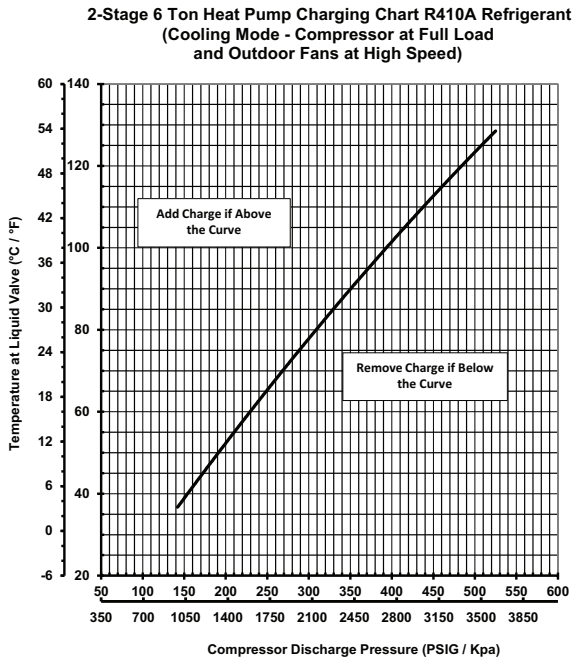


Fig. 24 — Cooling Charging Chart — 50HCQD07 2 Stage 6 Ton

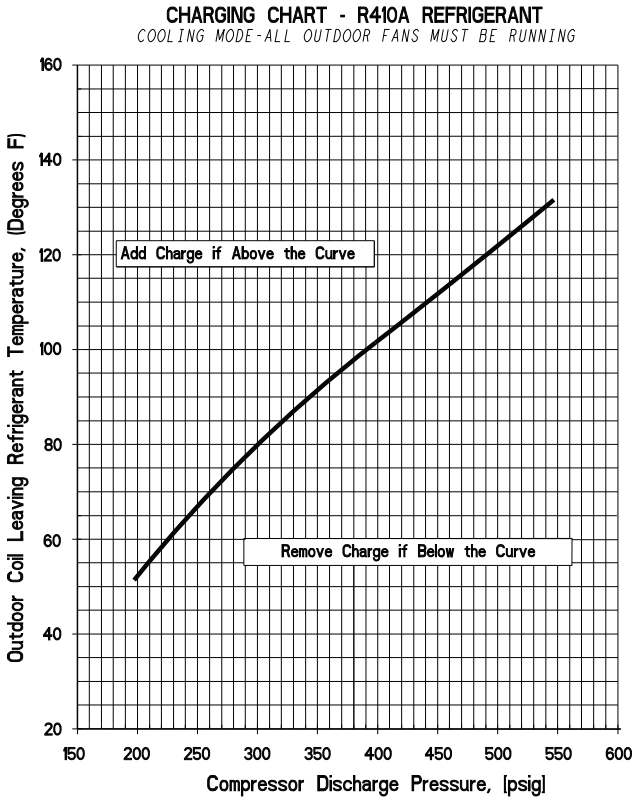


Fig. 25 — Cooling Charging Chart — 50HCQD08

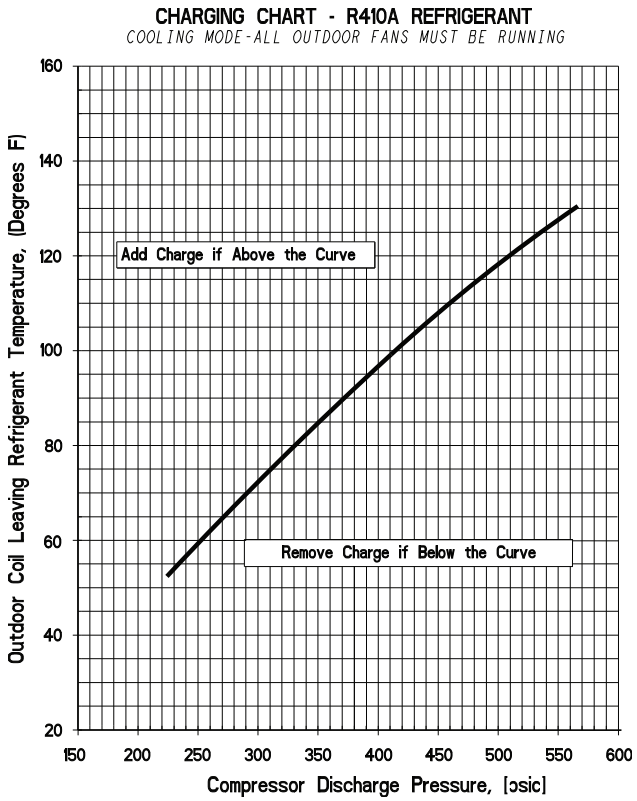


Fig. 26 — Cooling Charging Chart — 50HCQD09

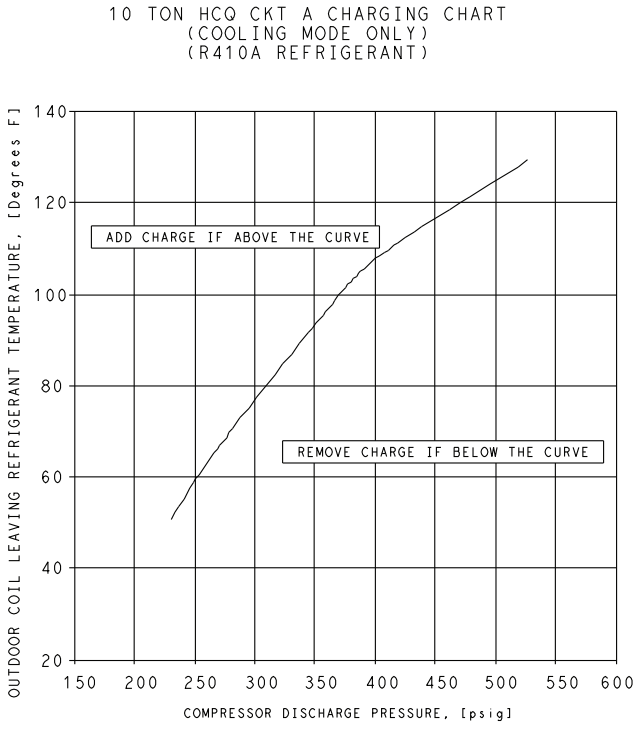


Fig. 27 — Cooling Charging Chart — 50HCQD12 Circuit A

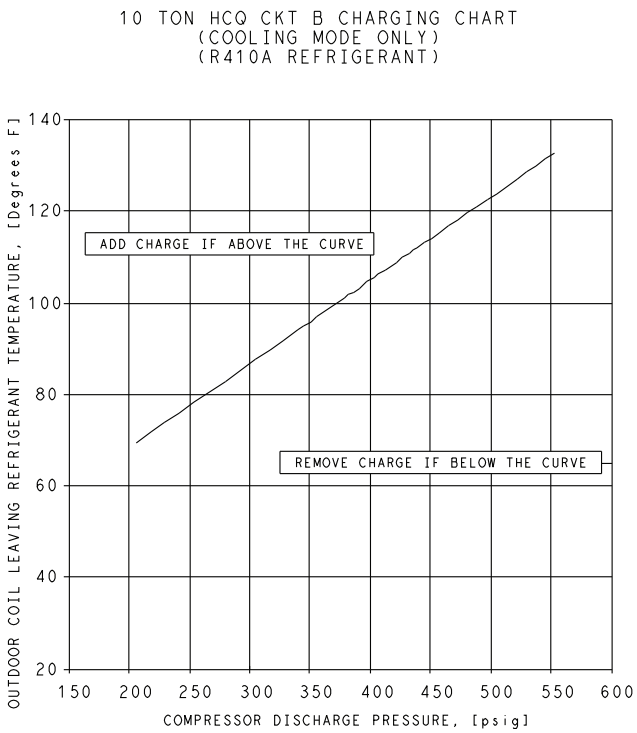


Fig. 28 — Cooling Charging Chart — 50HCQD12 Circuit B

COMPRESSOR

Lubrication

The compressor is charged with the correct amount of oil at the factory.

⚠ CAUTION

INSTALLATION SITE DAMAGE

Failure to follow this caution can result in damage to equipment location site.

Puron (R-410A) refrigerant contains polyolester (POE) oil that can damage the roof membrane. Caution should be taken to prevent POE oil from spilling onto the roof surface.

The factory also recommends that the suction and discharge lines be cut with a tubing cutter instead of using a torch to remove brazed fittings.

Replacing Compressor

⚠ WARNING

FIRE, EXPLOSION HAZARD

Failure to follow this warning could result in death, serious personal injury and/or property damage.

Never use air or gases containing oxygen for leak testing or for operating refrigerant compressors. Pressurized mixtures of air or gases containing oxygen can lead to an explosion.

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The factory also recommends that the suction and discharge lines be cut with a tubing cutter instead of using a torch to remove brazed fittings.

NOTE: Only factory-trained service technicians should remove and replace compressor units.

Compressors using Puron refrigerant contain a polyolester (POE) oil. This oil has a high affinity for moisture. Do not remove the compressor's tube plugs until ready to insert the unit suction and discharge tube ends.

Compressor Rotation

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution can result in premature wear and damage to equipment.

Scroll compressors can only compress refrigerant if rotating in the right direction. Reverse rotation for extended times can result in internal damage to the compressor. Scroll compressors are sealed units and cannot be repaired on site location.

NOTE: When the compressor is rotating in the wrong direction, the unit makes an elevated level of noise and does not provide cooling.

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.
   NOTE: If the suction pressure does not drop and the discharge pressure does not rise to normal levels, the evaporator fan is probably also rotating in the wrong direction.
3. Turn off power to the unit.
4. Reverse any two of the three unit power leads.
5. Reapply electrical power to the compressor. The suction pressure should drop and the discharge pressure should rise which is normal for scroll compressors on start-up.
6. Replace compressor if suction/discharge pressures are not within specifications for the specific compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

Filter Drier

Replace the Filter Drier whenever refrigerant system is exposed to atmosphere. Only use factory specified liquid-line filter driers with working pressures no less than 650 psig (4482 kPa).

⚠ CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this CAUTION can result in premature wear and damage to equipment.

Do not install a suction-line filter drier in liquid line. A liquid-line filter drier designed for use with Puron refrigerant is required on every unit.

Outdoor Fan Location

1. Shut off unit power supply. Apply lockout/tagout procedures.
2. Remove condenser-fan assembly (grille, motor, and fan).
3. Loosen fan hub setscrews.
4. Adjust fan height as shown in Fig. 29.
5. Tighten setscrews to 84 in-lbs (9.5 Nm).
6. Replace condenser-fan assembly.

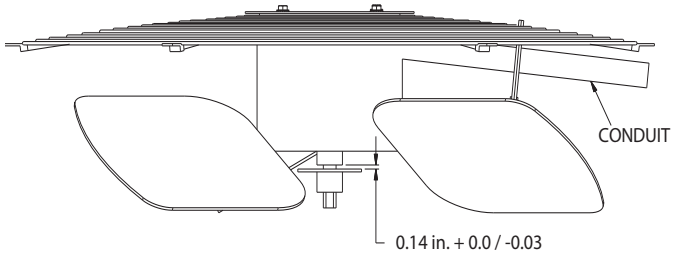


Fig. 29 — Condenser Fan Adjustment

Troubleshooting Cooling System

Refer to Table 6 for additional troubleshooting topics.

Table 6 — Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Compressor and Outdoor Fan Will Not Start	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker. Determine root cause.
	Defective thermostat, contactor, transformer. control relay, or capacitor.	Replacement component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
	High pressure switch tripped.	See problem “Excessive head pressure.”
	Low pressure switch tripped.	Check system for leaks. Repair as necessary.
	Freeze-up protection thermostat tripped.	See problem “Suction pressure too low.”
Compressor Will Not Start but Outdoor Fan Runs	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor or allow enough time for internal overload to cool and reset.
	Defective run/start capacitor, overload, start relay.	Determine cause. Replace compressor or allow enough time for internal overload to cool and reset.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (Other Than Normally Satisfying Thermostat)	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked outdoor coil or dirty air filter.	Determine cause and correct.
	Defective run/start capacitor, overload, start relay.	Determine cause and correct.
	Defective thermostat.	Replace thermostat.
	Faulty outdoor-fan (cooling) or indoor-fan (heating) motor or capacitor.	Replace faulty part.
	Restriction in refrigerant system.	Locate restriction and remove.
	Defective loader plug.	Determine cause and replace.
Compressor Operates Continuously	Dirty air filter.	Replaced filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low (cooling).	Reset thermostat.
	Low refrigerant charge.	Locate leak; repair and recharge.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Outdoor coil dirty or restricted.	Clean coil or remove restriction.
Compressor Makes Excessive Noise	Compressor rotating in the wrong direction.	Reverse the 3-phase power leads as described in Start-Up.
Excessive Head Pressure	Dirty outside.	Replace filter.
	Dirty outdoor coil (cooling).	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condensing air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low	Low refrigerant charge.	Check for leaks; repair and recharge
	Compressor scroll plates defective.	Replace compressor
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure	High heat load.	Check for source and eliminate.
	Compressor scroll plates defective.	Replace compressor.
	Refrigerant overcharge.	Recover excess refrigerant.
Suction Pressure Too Low	Dirty air filter (cooling).	Replace filter.
	Dirt or heavily iced outdoor coil (heating).	Clean outdoor coil. Check defrost cycle operation.
	Low refrigerant charge.	Check for leaks; repair and recharge.
	Metering device or low side restricted	Remove source of restriction.
	Insufficient indoor airflow (cooling mode).	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.
	Outdoor ambient temperature below 25°F (cooling).	Install low-ambient kit.
	Outdoor fan motor(s) not operating (heating).	Check fan motor operation.

CONVENIENCE OUTLETS

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

Units with convenience outlet circuits may use multiple disconnects. Check convenience outlet for power status before opening unit for service. Locate its disconnect switch, if appropriate, and open it. Lock-out and tag-out this switch, if necessary.

Two types of convenience outlets are offered on 50HCQ models: Non-powered and unit-powered. Both types provide a 125VAC Ground-Fault Circuit-Interrupt (GFCI) duplex receptacle rated at 15A behind a hinged waterproof access cover, located on the end panel of the unit. See Fig. 30.

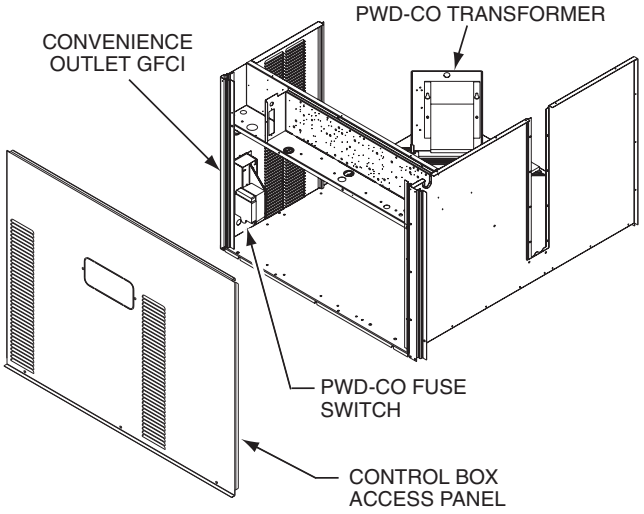


Fig. 30 — Convenience Outlet Location

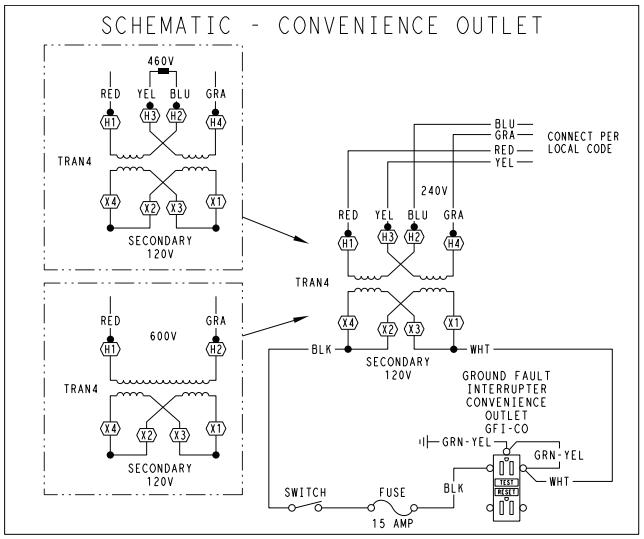
Non-Powered Type

This type requires the field installation of a general-purpose 125-volt 15-A circuit powered from a source elsewhere in the building. Observe national and local codes when selecting wire size, fuse or breaker requirements and disconnect switch size and location. Route 125-v power supply conductors into the bottom of the utility box containing the duplex receptacle.

Unit-Powered Type

A unit-mounted transformer is factory-installed to step-down the main power supply voltage to the unit to 115-v at the duplex receptacle. This option also includes a manual switch with fuse, located in a utility box and mounted on a bracket behind the convenience outlet; access is through the unit's control box access panel. See Fig. 30.

The primary leads to the convenience outlet transformer are not factory-connected. Selection of primary power source is a customer-option. If local codes permit, the transformer primary leads can be connected at the line-side terminals on a unit-mounted non-fused disconnect or Heating, Air Conditioning and Refrigeration (HACR) breaker switch; this will provide service power to the unit when the unit disconnect switch or HACR switch is open. Other connection methods will result in the convenience outlet circuit being de-energized when the unit disconnect or HACR switch is open. See Fig. 31.



UNIT VOLTAGE	CONNECT AS	PRIMARY CONNECTIONS	TRANSFORMER TERMINALS
208, 230	240	L1: RED +YEL L2: BLU + GRA	H1 + H3 H2 + H4
460	480	L1: RED Splice BLU + YEL L2: GRA	H1 H2 + H3 H4
575	600	L1: RED L2: GRA	H1 H2

Fig. 31 — Powered Convenience Outlet Wiring

DUTY CYCLE

The unit-powered convenience outlet has a duty cycle limitation. The transformer is intended to provide power on an intermittent basis for service tools, lamps, etc; it is not intended to provide 15A loading for continuous duty loads (such as electric heaters for overnight use). Observe a 50% limit on circuit loading above 8A (i.e., limit loads exceeding 8A to 30 minutes of operation every hour).

Installing Weatherproof Cover

A weatherproof while-in-use cover for the factory installed convenience outlets is now required by UL standards. This cover cannot be factory-mounted due to its depth. The cover must be installed at unit installation. For shipment, the convenience outlet is covered with a blank cover plate.

The weatherproof cover kit is shipped in the unit's control box. The kit includes the hinged cover, a backing plate and gasket.

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

1. Remove the blank cover plate at the convenience outlet; discard the blank cover.
2. Loosen the two screws at the GFCI duplex outlet, until approximately $^1/_2$-in. (13 mm) under screw heads are exposed.
3. Press the gasket over the screw heads. Slip the backing plate over the screw heads at the keyhole slots and align with the gasket; tighten the two screws until snug (do not over-tighten).
4. Mount the weatherproof cover to the backing plate as shown in Fig. 32.

5. Remove two slot fillers in the bottom of the cover to permit service tool cords to exit the cover.
6. Check cover installation for full closing and latching.

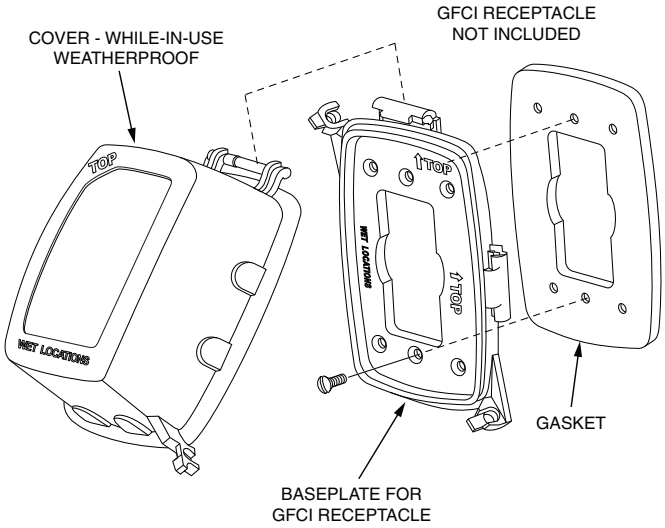


Fig. 32 — Weatherproof Cover Installation

Maintenance

Periodically test the GFCI receptacle by pressing the TEST button on the face of the receptacle. This should cause the internal circuit of the receptacle to trip and open the receptacle. Check for proper grounding wires and power line phasing if the GFCI receptacle does not trip as required. Press the RESET button to clear the tripped condition.

Fuse on Powered Type

The factory fuse is a Bussmann[1] Fusetron T-15, non-renewable screw-in (Edison base) type plug fuse.

Using Unit-Mounted Convenience Outlets

Units with unit-mounted convenience outlet circuits will often require that two disconnects be opened to de-energize all power to the unit. Treat all units as electrically energized until the convenience outlet power is also checked and de-energization is confirmed. Observe National Electrical Code Article 210, Branch Circuits, for use of convenience outlets.

HEAT PUMP CONTROLS

Central Terminal Board

The Central Terminal Board (CTB) is a large printed circuit board that is located in the center of the unit control box. This printed circuit board contains multiple termination strips and connectors to simplify factory control box wiring and field control connections. Terminals are clearly marked on the board surface. See Fig 33.

The CTB contains no software and no logic. But it does include seven configuration jumpers that are cut to configure the board to read external optional and accessory controls, including that the unit is a heat pump. See Table 7.

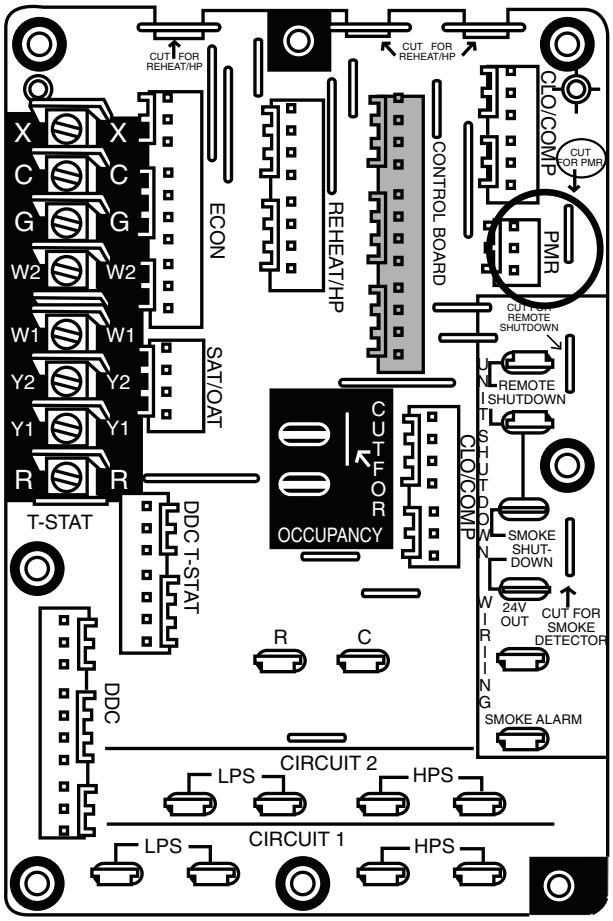


Fig. 33 — Central Terminal Board (CTB)

Table 7 — Jumper Configuration

JUMPER	CONTROL FUNCTION	NOTE
JMP1	Phase Monitor	
JMP2	Occupancy Control	
JMP3	Smoke Detector Shutdown	
JMP4	Remote Shutdown	
JMP5	Heat Pump / Reheat	50HCQ default: Cut
JMP6	Heat Pump / Reheat	50HCQ default: Cut
JMP7	Heat Pump / Reheat	50HCQ default: Cut

Jumpers JMP5, JMP6 and JMP7 are located in notches across the top of the CTB. See Fig. 33. These jumpers are factory cut on all heat pump units. Visually check these jumpers to confirm that they have been cut.

PROTECTIVE CONTROLS

Compressor Protection

OVERCURRENT

The compressor has internal line-break motor protection.

OVERTEMPERATURE

The compressor has an internal protector to protect it against excessively high discharge gas temperatures.

1. Bussman and Fusetron are trademarks of Cooper Technologies Company.

HIGH PRESSURE SWITCH

The system is provided with a high pressure switch mounted on the discharge line. The switch is stem-mounted and brazed into the discharge tube. Trip setting is 630 psig ± 10 psig (4344 ± 69 kPa) when hot. Reset is automatic at 505 psig (3482 kPa).

LOSS OF CHARGE SWITCH

The system is protected against a loss of charge and low evaporator coil loading condition by a loss of charge switch located on the liquid line and a freeze protection thermostat on the indoor coil. The switch is stem-mounted. Loss of Charge Switch trip setting is 27 psig ± 3 psig (186 ± 21 kPa). Reset is automatic at 44 ± 3 psig (303 ± 21 kPa).

Freeze Protection Thermostat trip setting is 30°F ± 5°F (-1°C ± 3°C). Reset is automatic at 45°F ± 5°F (7°C ± 3°C).

Supply (Indoor) Fan Motor Protection

Disconnect all electrical power and apply appropriate Lockout/Tagout procedures when servicing the fan motor.

Motors are equipped with an over-temperature device (Thermik[1]), internal line break, external circuit breaker or electronic controlled circuits for overload protection. All protection schemes are automatically reset except for units having the 2-speed indoor fan option (VFD) or external circuit breakers. These two protection schemes are classified as manual reset. The type of device depends on several factors including motor size, voltage and other options in the unit (i.e. VFD).

The Thermik device is a snap-action over-temperature protection device that is embedded in the motor windings. It is also a pilot-circuit device that is wired into the unit's 24V control circuit. When this device reaches its trip set point, it opens the 24V control circuit and causes all unit operation to stop. This device resets automatically when the motor windings cool. Do not bypass this device to correct trouble. Determine the cause of the problem and correct it.

The External motor overload device is a specially calibrated circuit breaker that is UL recognized as a motor overload controller. It is an over-current device. When the motor current exceeds the circuit breaker set point, the device opens all motor power leads and the motor shuts down. Reset requires a manual reset at the overload switch. This device (designated IFCB) is located on the side of the supply fan housing, behind the fan access panel.

TROUBLESHOOTING SUPPLY FAN MOTOR OVERLOAD TRIPS

The supply fan used in the 50HCQ units is a forward-curved centrifugal wheel. At a constant wheel speed, this wheel has a characteristic that causes the fan shaft load to DECREASE when the static pressure in the unit-duct system increases and to INCREASE when the static pressure in the unit-duct system decreases (and fan airflow rate increases). Motor overload conditions typically develop when the unit is operated with an access panel removed, with unfinished duct work, in an economizer-open mode, or a leak develops in the duct system that allows a bypass back to unit return opening.

Outdoor Fan Motor Protection

The outdoor fan motor is internally protected against overtemperature.

CONTROL CIRCUIT, 24V

The control circuit is protected against over-current conditions by a circuit breaker mounted on control transformer TRAN. The Control Circuit is reset manually.

COMMERCIAL DEFROST CONTROL

The Commercial Defrost Control Board (DFB) coordinates thermostat demands for supply fan control, 1 or 2 stage cooling, 2 stage heating, emergency heating and defrost control with unit operating sequences. The DFB also provides an indoor fan off delay feature (user selectable). See Fig. 34 for board arrangement.

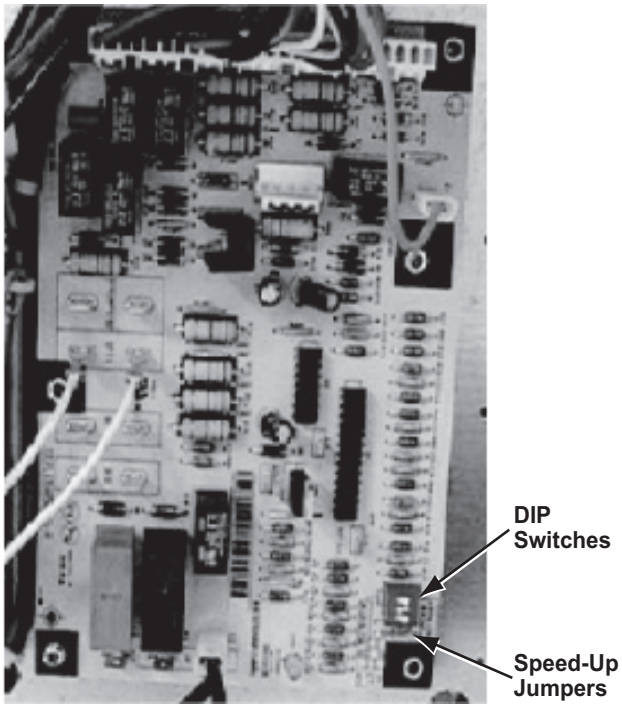


Fig. 34 — Defrost Control Board Arrangement

The DFB is located in the 50HCQ's main control box (see Fig. 35). All connections are factory-made through harnesses to the unit's CTB, to IFC (belt-drive motor) or to ECM (direct-drive motor), reversing valve solenoids and to defrost thermostats. Refer to Table 8 for details of DFB Inputs and Outputs.

Reversing Valve Control

The DFB has two outputs for unit reversing valve control. Operation of the reversing valves is based on internal logic; this application does not use an "O" or "B" signal to determine reversing valve position. Reversing valves are energized during the cooling stages and the defrost cycle and de-energized during heating cycles. Once energized at the start of a cooling stage, the reversing valve will remain energized until the next heating cycle demand is received. Once de-energized at the start of a Heating cycle, the reversing valves will remain de-energized until the next cooling stage is initiated.

Compressor Control

The DFB receives inputs indicating Stage 1 Cooling, Stage 2 Cooling (sizes 08 - 12) and Stage 1 Heating from the space thermostat or unit control system (PremierLink or RTU Open); it generates commands to start compressors with or without reversing valve operation to produce Stage 1 Cooling (one compressor on 08-12 sizes), Stage 2 Cooling (both compressors run on 08-12 sizes) or Stage 1 Heating (both compressors run on 08-12 systems. The 04-07 systems have only one compressor). On 2-Stage 07 units, Stage 1 Cooling operates compressor unloaded (67%) and Stage 2 Cooling operates compressor at full load (100%).

1. Thermik is a trademark of Thermik Geratebau GmbH.

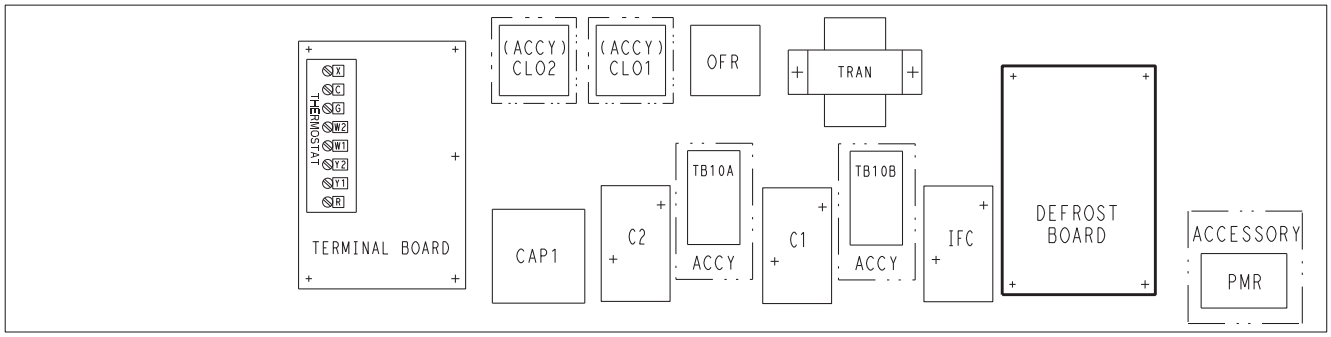


Fig. 35 — Defrost Control Board Location

Table 8 — 50HCQ Defrost Board I/O and Jumper Configurations

	POINT NAME	TYPE OF I/O	CONNECTION PIN NUMBER	UNIT CONNECTION	NOTE
INPUTS	G Fan	DI, 24Vac	P2-3	LCTB-G	
	Y1 Cool 1	DI, 24Vac	P2-5	LCTB-Y1	
	Y2 Cool 2	DI, 24Vac	P2-4	LCTB-Y2	
	W1 Heat 1	DI, 24Vac	P2-7	LCTB-W1	
	W2 Heat 2	DI, 24Vac	P2-6	LCTB-W2	
	R Power	24Vac	P3-1	CONTL BRD-8	
	C Common	24Vac	P3-2	CONTL BRD-4	
	DFT1	DI, 24Vac	DFT-1 to DFT-1		
	DFT2	DI, 24Vac	DFT-2 to DFT-2		
OUTPUTS	IFO Fan On	DO, 24Vac	P3-9	REHEAT-2	
	OF OD Fan On	DO, 24Vac	OF	OFR	
	RVS1	DO, 24Vac	P3-7 to P3-5		Energize in COOL
	RVS2	DO, 24Vac	P3-6 to P3-4		Energize in COOL
	COMP 1	DO, 24Vac	P3-10	FPT-REHEAT-6	
	COMP 2	DO, 24Vac	P3-8	REHEAT-8	
	HEAT 2	DO, 24Vac	E-HEAT	HC-1 (TB4-1)	
	COM	24Vac	P3-3	HC-1 (TB4-3)	
CONFIGURATION	Select Jumper	24Vac	P1-1		
	2 Compressor	24Vac	P1-3		Use for 50HCQD
SPEED-UP CONFIGURATION	Speed-Up Jumper		JMP17		
	Speed-Up Jumper		JMP18		

NOTES:
1. Jumper for 1-3 seconds: Factory Test, defrost runs for 9 seconds.
2. Jumper for 5-20 seconds: Forced Defrost, defrost runs for 30 seconds if DFT2 is open.

Auxiliary (Electric) Heat Control

The 50HCQ unit can be equipped with one or two auxiliary electric heaters, to provide a second stage of heating. The DFB will energize this Heating System for a Stage 2 Heating Command (heaters operate concurrently with compressor(s) in the Stage 1 Heating cycle), for an Emergency Heating sequence (compressors are off and only the electric heaters are energized) and also during the Defrost cycle (to eliminate a "cold blow" condition in the space).

Defrost

The defrost control mode is a time/temperature sequence. There are two time components: The continuous run period and the test/defrost cycle period. The temperature component is provided by Defrost Thermostat 1 and 2 (DFT1 and DFT2 (D08-D09 only) mounted on the outdoor coil.

The continuous run period is a fixed time period between the end of the last defrost cycle (or start of the current Heating cycle) during which no defrost will be permitted. This period can be set at 30, 60, 90 or 120 minutes by changing the positions of DIP switches SW1 and SW2 (see Fig. 34 and Table 9). The default run periods are 60 minutes for unit sizes 04-06, 30 minutes for unit size 07, 90 minutes for unit sizes 08-09 and 60 minutes for unit size 12.

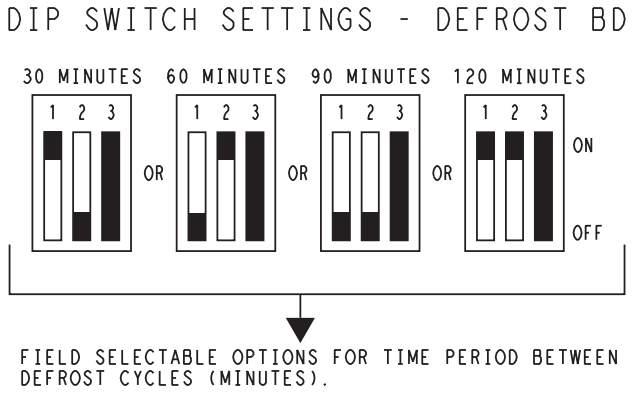


Fig. 36 — DIP Switch Settings — Defrost Board

At the end of the continuous run period, the defrost control will test for a need to defrost. On unit sizes 04-07 (single compressor designs), DFT1 controls the start and termination of the defrost cycle. If DFT1 is still open, the defrost test/run window is closed and the control repeats the continuous run period. If DFT1 is closed, the defrost cycle is initiated. The defrost period will end when DFT1 opens (indicating the outdoor coil has been cleared of frost and ice) or a 10 minute elapsed period expires, whichever comes first.

ON UNIT SIZES 08 AND 12 (TWO CIRCUIT DESIGNS)

DFT2 (located on the bottom circuit of the outdoor coil on the 08-09 size and the outdoor coil with two bends on the 12 size) controls the start and termination of the defrost cycle. If DFT2 is still open, the defrost test/run window is closed and the control repeats the continuous run period. If DFT2 is closed, the defrost cycle is initiated in Circuit 2. The defrost period will end when DFT2 opens (indicating the outdoor coil has been cleared of frost and ice) or a 10 minute elapsed period expires, whichever comes first.

ON SIZES 08-12

Circuit 1's defrost thermostat DFT1 (located on the upper circuit of the outdoor coil on 08-09 size and the outdoor coil with one bend on the 12 size) cannot initiate a unit defrost cycle; only DFT2 can do this. But once Circuit 2 is in defrost, the DFB will monitor the status of DFT1. If DFT1 closes during a Circuit 2 defrost cycle, Circuit 1 will also enter a defrost cycle. Circuit 1's defrost cycle will end when DFT1 opens (indicating the upper portion of the outdoor coil is cleared of frost and ice) or the Circuit 2 defrost cycle is terminated.

At the end of the unit defrost cycle, the unit will be returned to Heating cycle for a full continuous run period. If the space heating load is satisfied and compressor operation is terminated, the defrost control will remember where the run period was interrupted. On restart in Heating, the defrost control will resume unit operation at the point in the run period where it was last operating.

Defrost Thermostats

These are temperature switches that monitor the surface temperature of the outdoor coil circuits. These switches are mounted on the liquid tube exiting the outdoor coil heating circuits. These switches close on temperature drop at 30°F (-1°C) and reset open on temperature rise at 80°F (27°C).

Indoor Fan Off Delay

The DFB can provide a 60 sec delay on Indoor Fan Off if the thermostat's fan selector switch is set on AUTO control. DIP Switch SW3 on the DFB selects use of the fan off time delay feature. Setting SW3 in the OPEN position turns the Fan Off Delay feature on; setting SW3 in the CLOSED position disables this feature. The delay period begins when Y1 demand or W1 demand by the space thermostat is removed.

Defrost Speedup Functions

The DFB permits the servicer to speed up the defrost cycle. There are two speed-up sequences: relative speed-up and an immediate forced defrost. Speed-up sequences are initiated by shorting jumper wires JMP17 and JMP18 together (see Fig. 34); use a flat-blade screwdriver.

Shorting the jumpers for a period of 1 to 3 seconds reduces the defrost timer periods by a factor of 0.1 sec/minute. (For example, the 90 minute run period is reduced to 9 seconds) The DFB will step the unit through a Heating cycle and a Defrost cycle using these reduced time periods. This mode ends after the Defrost cycle.

Shorting the jumpers for a period of 5 to 20 secs bypasses the remaining continuous run period and places the unit in a Forced Defrost mode. If the controlling DFT is closed when this mode is initiated, the unit will complete a normal defrost period that will terminate when the controlling DFT opens or the 10 minute defrost cycle limit is reached. If the controlling DFT is open when this mode is initiated, the Defrost cycle will run for 30 secs. Both modes end at the end of the Defrost cycle.

Table 9 — DIP Switch Positions

	1	2		1	2		1	2		1	2		3	
1			1		J	1	J		1	J	J	1		On
0	J	J	0	J		0		J	0			0	J	Off
	90 Minutes			60 Minutes			30 Minutes			120 Minutes			Fan Delay	

ELECTRIC HEATERS

The 50HCQ units can be equipped with field-installed accessory electric heaters. The heaters are modular in design, with heater frames holding open coil resistance wires strung through ceramic insulators and control contactor(s), using a combination of 24v control side break/auto-reset or line-break/auto-reset limit switches and a pilot-circuit/manual reset limit switch to protect the unit against over-temperature situations. One or two heater modules can be used in a unit.

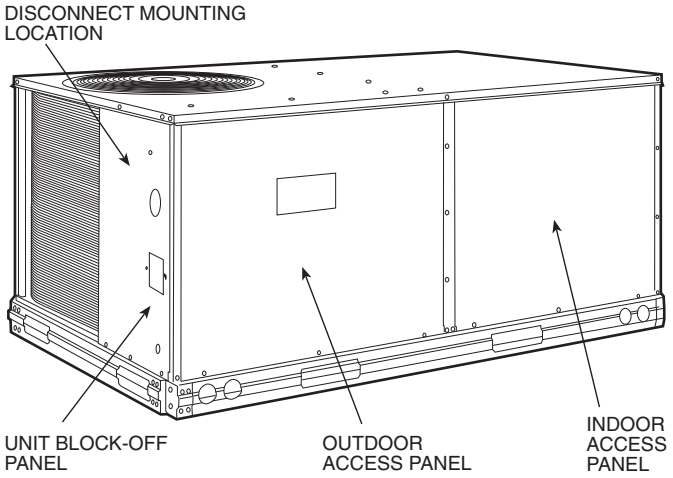


Fig. 37 — Typical Access Panel Location (3-6 Ton)

Heater modules are installed in the compartment below the indoor (supply) fan outlet. Access is through the indoor access panel. Heater modules slide into the compartment on tracks along the bottom of the heater opening. See Fig. 37-39.

Not all available heater modules can be used in every unit. Use only those heater modules that are UL listed for use in a specific size unit. Refer to the label on the unit cabinet re approved heaters.

Unit heaters are marked with Heater Model Numbers. However, heaters are ordered as and shipped in cartons marked with a corresponding heater Sales Package part number. See Table 10 for correlation between heater Model Number and Sales Package part number.

NOTE: The value in position 9 of the part number differs between the sales package part number (value is 1) and a bare heater model number (value is 0).

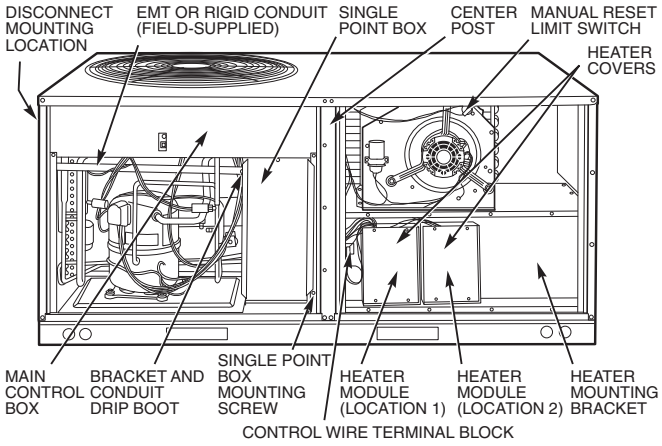


Fig. 38 — Typical Component Location

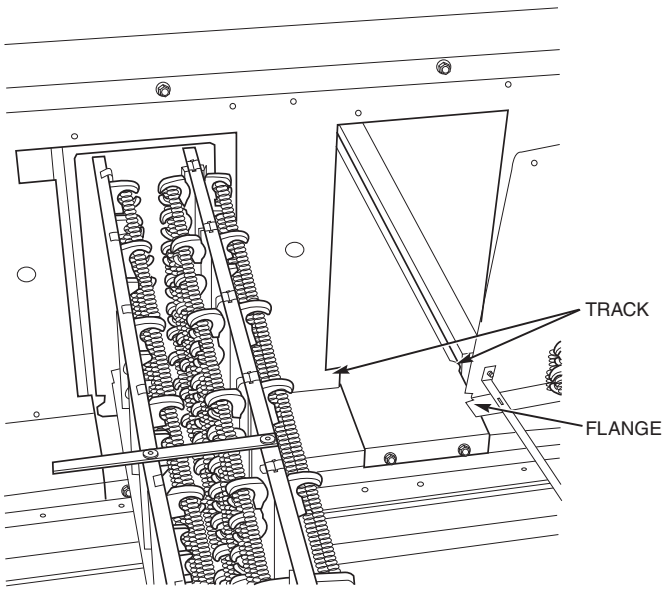


Fig. 39 — Typical Module Installation

Table 10 — Heater Model Number

BARE HEATER MODEL NUMBER	C	R	H	E	A	T	E	R	0	0	1	A	0	0
Heater Sales Package P/N includes:														
Bare Heater	C	R	H	E	A	T	E	R	1	0	1	A OR B	0	0
Carton and packing materials														
Installation sheet														

Single Point Boxes and Supplementary Fuses

When the unit MOCP device value exceeds 60A, unit-mounted supplementary fuses are required for each heater circuit. These fuses are included in accessory single point boxes, with power distribution and fuse blocks. The single point box will be installed directly under the unit control box, just to the left of the partition separating the indoor section (with electric heaters) from the outdoor section. The single point box has a hinged access cover. See Fig. 40.

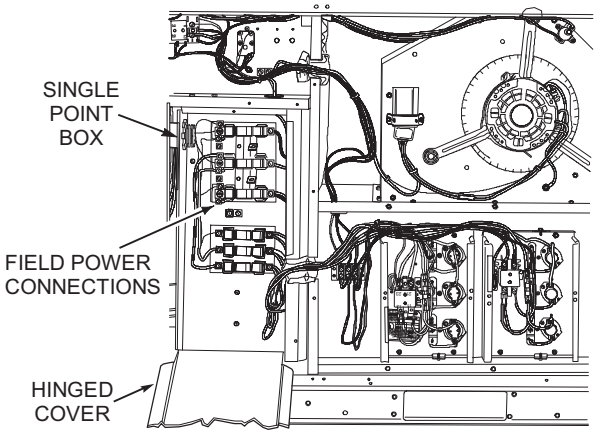


Fig. 40 — Typical Single Point Installation

On 50HCQ units, all fuses are 60A. Single point boxes containing fuses for 208/230V applications use UL Class RK5 250V fuses (Bussmann FRNR 60 or Shawmut TR 60R). Single point boxes for 460V and 575V applications use UL Class T 600V fuses (Bussmann JJS 60 or Shawmut A6T 60). (Note that all heaters are qualified for use with a 60A fuse, regardless of actual heater ampacity, so only 60A fuses are necessary.)

On 07-09 size units, unit heater applications not requiring supplemental fuses require a special Single Point Box without any fuses. Connect power supply conductors to heater conductors and field-supplied base unit power tap leads (see "Completing Heater Installation") inside the empty Single Point Box using UL-approved connectors.

Safety Devices

Electric heater applications other than CRHEATER113B00-116B00, 128B00, and 129B00 use a combination of 24v control side break/auto-reset or line-break/auto-reset limit switches and a pilot-circuit/manual reset limit switch to protect the unit against over-temperature situations.

CRHEATER113B00-116B00, 128B00, and 129B00 electric heater applications use a combination of 24v control side break/auto-reset, line-break/non-resettable "one shot" limit switches, and a pilot-circuit/manual reset limit switch to protect the unit against over-temperature situations.

Line-break/auto-reset limit switches, 24v control side break/auto-reset and line-break/non-resettable "one shot" limit switches are mounted on the base plate of each heater module. See Fig. 41. These are accessed through the indoor access panel. Remove the switch by removing two screws into the base plate and extracting the existing switch.

Pilot-circuit/manual reset limit switch is located in the side plate of the indoor (supply) fan housing. See Fig. 38 and Fig 41.

Completing Heater Installation

FIELD POWER CONNECTIONS

Tap conductors must be installed between the base unit's field power connection lugs and the Single Point Box (with or without fuses). See Fig. 40. Refer to unit wiring schematic. Use copper wire only. For connection using the single point box without fuses, connect the field power supply conductors to the heater power leads and the field-supplied tap conductors inside the Single Point Box. Use UL approved pressure connectors (field-supplied) for these splice joints.

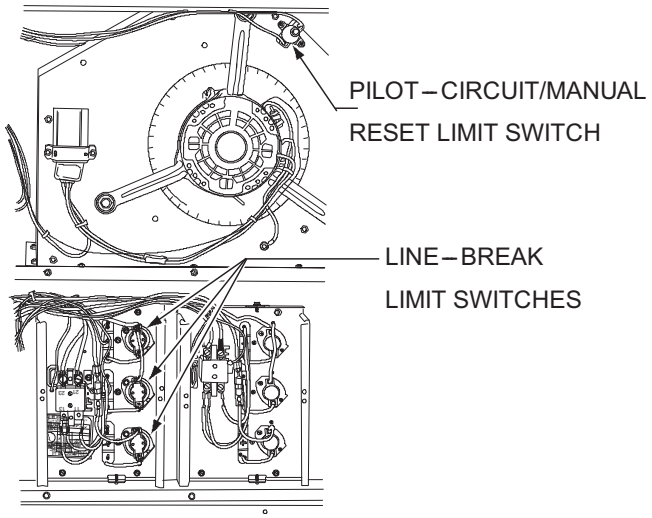


Fig. 41 — Typical Location of Heater Limit Switches (3-phase heater shown)

LOW-VOLTAGE CONTROL CONNECTIONS (ALL EXCEPT CRHEATER128B00-129B00)

Pull the low-voltage control leads from the heater module(s) — VIO and BRN (two of each if two modules are installed; identify for Module #1) — to the 4-pole terminal board TB4 located on the heater bulkhead to the left of Heater #1. Connect the VIO leads from both Heater #1 and #2 to terminal TB4-1. Connect both BRN leads to terminal TB4-3. See Fig. 42.

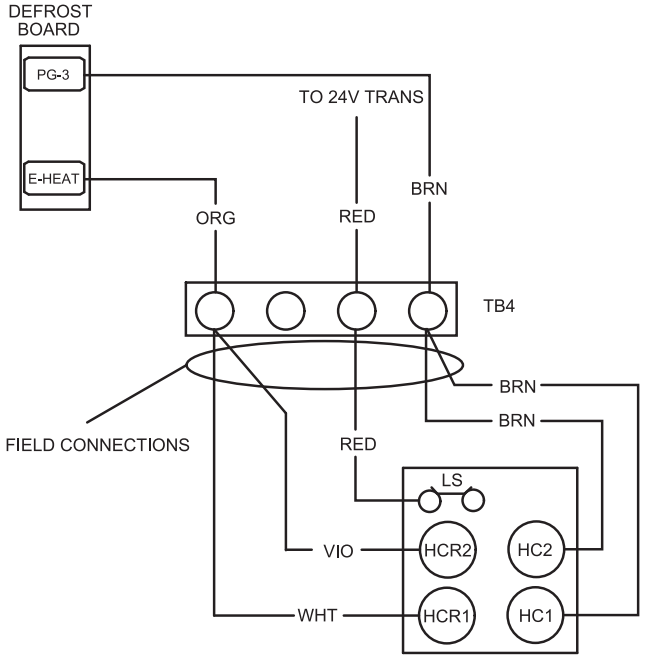


Fig. 42 — Accessory Electric Heater Control Connections (HP-2, Size 06, 575V Only)

LOW-VOLTAGE CONTROL CONNECTIONS (CRHEATER128B00-129B00)

Pull the low-voltage control leads from the heater module(s) — ORN, VIO and BRN — to the 4-pole terminal board TB4 located on the heater bulkhead to the left of Heater #1. Connect both the ORN and VIO lead to terminal TB4-1. Connect the BRN lead to terminal TB4-3. See Fig. 43.

The 50HCQ units use a various number of control wires, colors, and terminal boards depending on voltage and unit size. See Fig. 43-46 and the unit wiring diagram for proper placement.

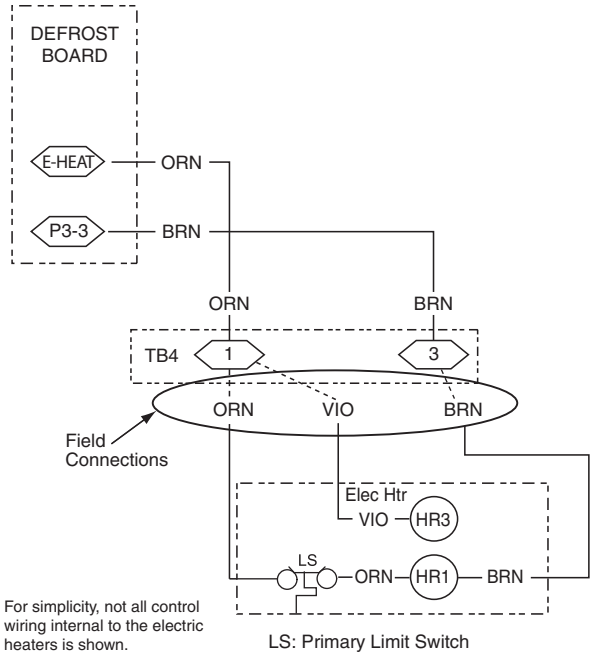


Fig. 43 — Accessory Electric Heater Control Connections (HP-1 Size 08-12, HP-2 Size 08-09) (CRHEATER128B00, 129B00 only)

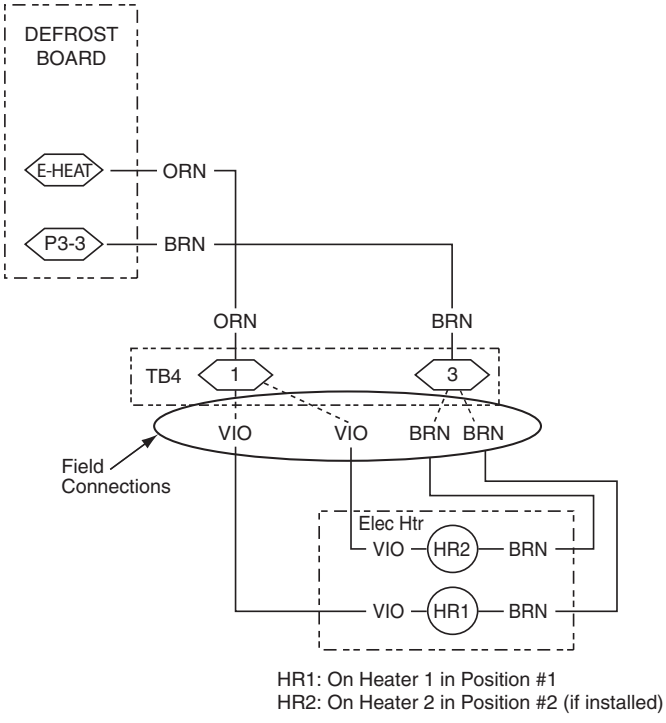


Fig. 44 — Accessory Electric Heater Control Connections (HP-1 Except Size 12 and 121, HP-2 Except Size 12)

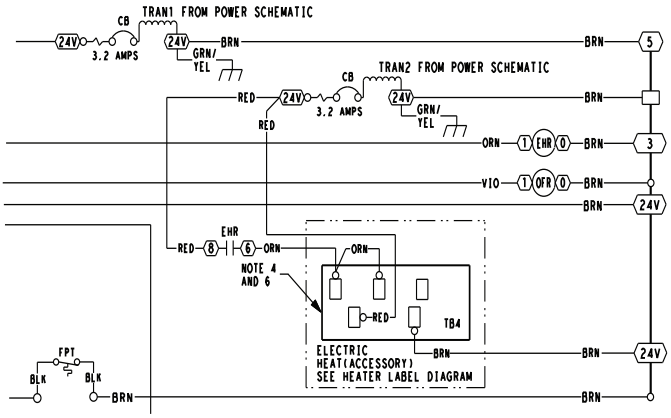


Fig. 45 — TB4 Wiring (HP Only)

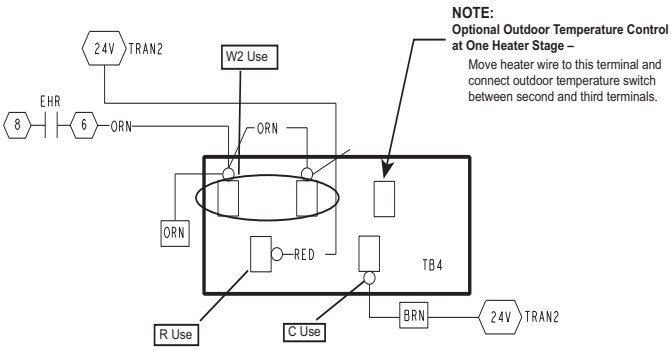


Fig. 46 — TB4 Terminal Use (HP Only)

SMOKE DETECTORS

Smoke detectors are available as factory-installed options on 50HCQ models. Smoke detectors may be specified for Supply Air only or for Return Air without or with economizer or in combination of Supply Air and Return Air. Return Air smoke detectors are arranged for vertical return configurations only. All components necessary for operation are factory-provided and mounted. The unit is factory-configured for immediate smoke detector shutdown operation; additional wiring or modifications to unit terminal board may be necessary to complete the unit and smoke detector configuration to meet project requirements.

System

The smoke detector system consists of a four-wire controller and one or two sensors. Its primary function is to shut down the rooftop unit in order to prevent smoke from circulating throughout the building. It is not to be used as a life saving device.

Controller

The controller (see Fig. 47) includes a controller housing, a printed circuit board, and a clear plastic cover. The controller can be connected to one or two compatible duct smoke sensors. The clear plastic cover is secured to the housing with a single captive screw for easy access to the wiring terminals. The controller has three LEDs (for Power, Trouble and Alarm) and a manual test/reset button (on the cover face).

Smoke Detector Sensor

The Smoke Detector Sensor (see Fig. 48) includes a plastic housing, a printed circuit board, a clear plastic cover, a sampling tube inlet and an exhaust tube. The sampling tube (when used) and exhaust tube are attached during installation. The sampling tube varies in length depending on the size of the rooftop unit. The clear plastic cover permits visual inspections without having to disassemble the sensor. The cover attaches to

the sensor housing using four captive screws and forms an airtight chamber around the sensing electronics. Each sensor includes a harness with an RJ45 terminal for connecting to the controller. Each sensor has four LEDs (for Power, Trouble, Alarm and Dirty) and a manual test/reset button (on the left-side of the housing).

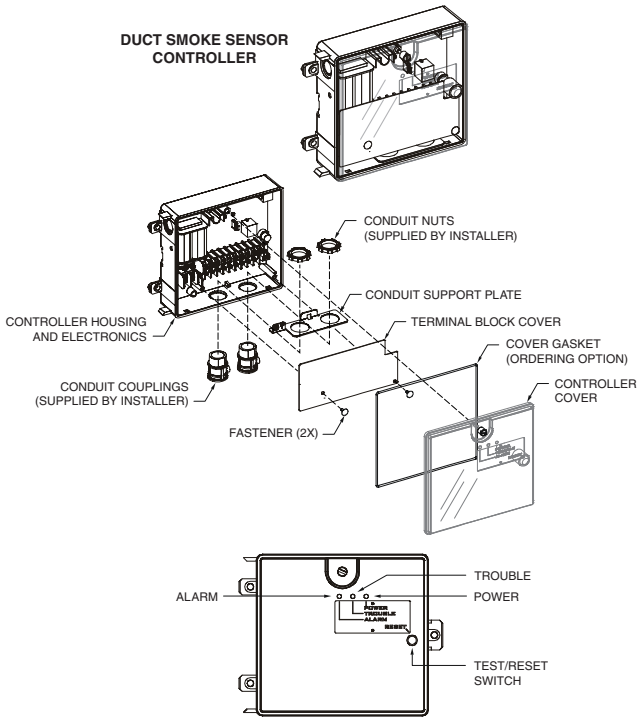


Fig. 47 — Controller Assembly

Air is introduced to the duct smoke detector sensor's sensing chamber through a sampling tube that extends into the HVAC duct and is directed back into the ventilation system through a (shorter) exhaust tube.

The difference in air pressure between the two tubes pulls the sampled air through the sensing chamber. When a sufficient amount of smoke is detected in the sensing chamber, the sensor signals an alarm state and the controller automatically takes the appropriate action to shut down fans and blowers, change over air handling systems, notify the fire alarm control panel, etc.

The sensor uses a process called differential sensing to prevent gradual environmental changes from triggering false alarms. A rapid change in environmental conditions, such as smoke from a fire, causes the sensor to signal an alarm state but dust and debris accumulated over time does not.

For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition.

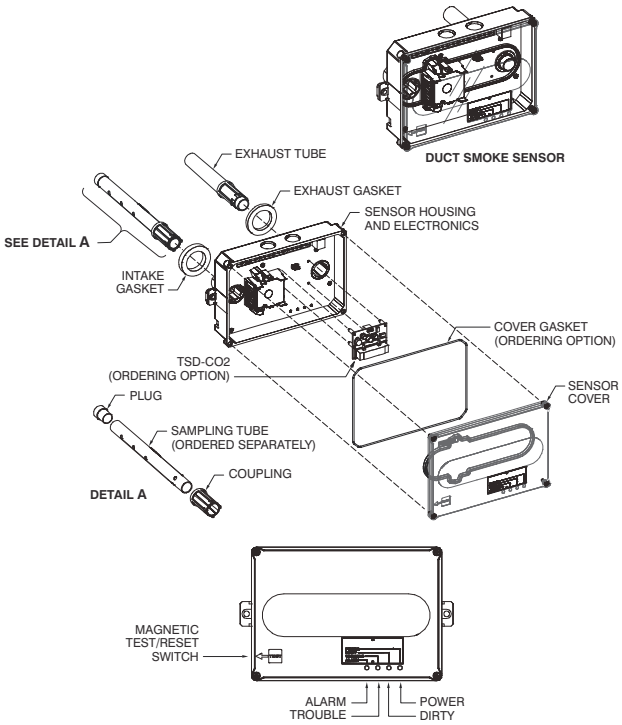


Fig. 48 — Smoke Detector Sensor

Smoke Detector Locations

SUPPLY AIR

The Supply Air Smoke Detector Sensor is located to the left of the unit's indoor (supply) fan. See Fig. 49. Access is through the fan access panel. There is no sampling tube used at this location. The sampling tube inlet extends through the side plate of the fan housing (into a high pressure area). The controller is located on a bracket to the right of the return filter, accessed through the lift-off filter panel.

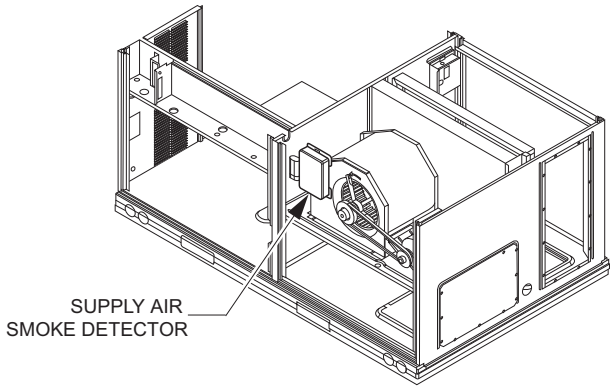
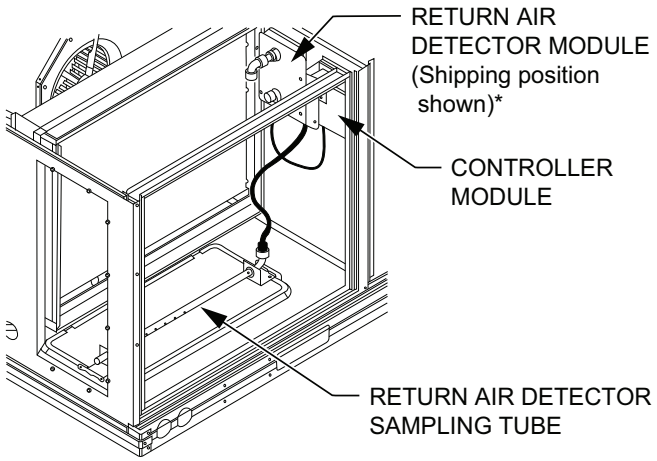


Fig. 49 — Typical Supply Air Smoke Detector Sensor Location

RETURN AIR SMOKE DETECTOR SENSOR WITHOUT ECONOMIZER

The sampling tube is located across the return air opening on the unit basepan. See Fig. 50. The holes in the sampling tube face downward, into the return air stream. The sampling tube is connected through tubing to the return air sensor that is mounted on a bracket high on the partition between return filter and controller location. (This sensor is shipped in a flat-mounting location. Installation requires that this sensor be relocated to its operating location and the tubing to the sampling tube be connected. See "Completing Installation of Return Air Smoke Sensor" for installation steps.)



*RA detector must be moved from shipping position to operating position by installer.

Fig. 50 — Typical Return Air Smoke Detector Location

RETURN AIR SMOKE DETECTOR SENSOR WITH ECONOMIZER

The sampling tube is inserted through the side plates of the economizer housing, placing it across the return air opening on the unit basepan. See Fig. 51. The holes in the sampling tube face downward, into the return air stream. The sampling tube is connected using tubing to the return air sensor mounted on a bracket high on the partition between return filter and controller location. The sensor is shipped in a flat-mounting location. Installation requires the sensor be relocated to its operating location and the tubing to the sampling tube be connected. See "Completing Installation of Return Air Smoke Sensor" for installation steps.

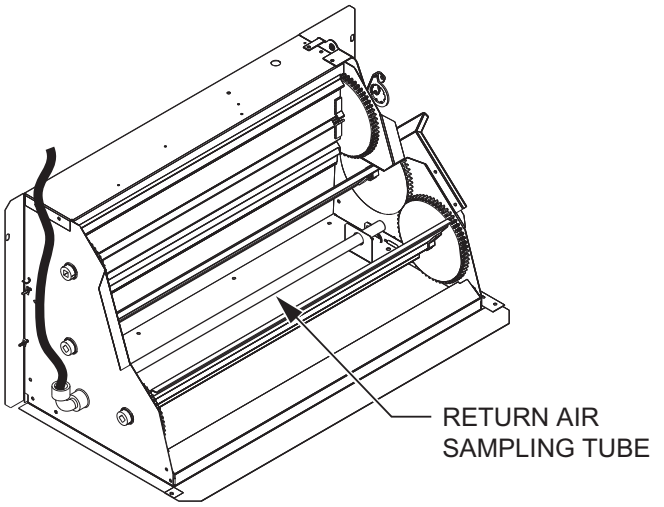


Fig. 51 — Return Air Sampling Tube Location (View reoriented to show opposite side for clarity)

Completing Installation of Return Air Smoke Detector

Use the following steps to complete the installation of the Return Air Smoke Detector.

1. Unscrew the two screws holding the Return Air Sensor Detector plate. See Fig. 52. Save the screws.

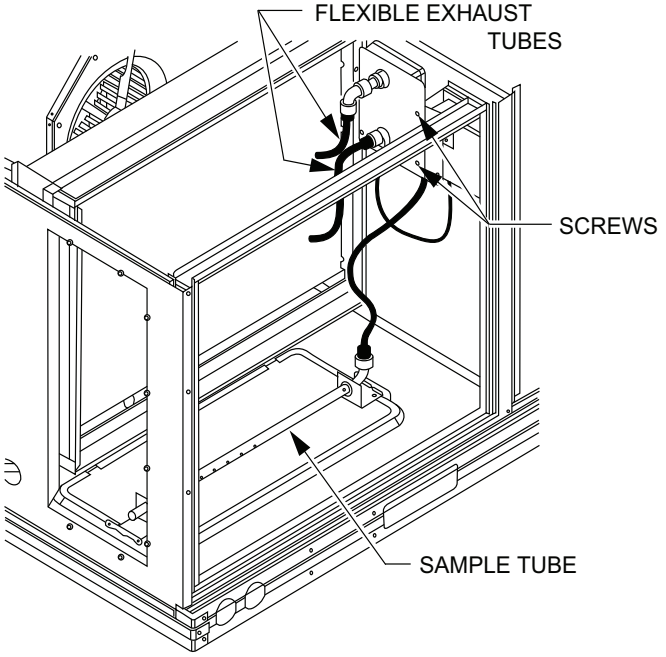


Fig. 52 — Return Air Smoke Detector Module Shipping Position

2. Remove the Return Air Smoke Sensor Module and its detector plate.
3. Rotate the detector plate so the sensor is facing outwards and the sampling tube connection is on the bottom. See Fig. 53.
4. Screw the sensor and detector plate into operating position using screws from Step 1. Ensure the sampling tube connection is on the bottom and the exhaust tube is on the top.
5. Connect the flexible tube on the sampling inlet to the sampling tube on the basepan.
6. For units with an economizer, the sampling tube is integrated into the economizer housing but connecting the flexible tubing to the sampling tube is the same.

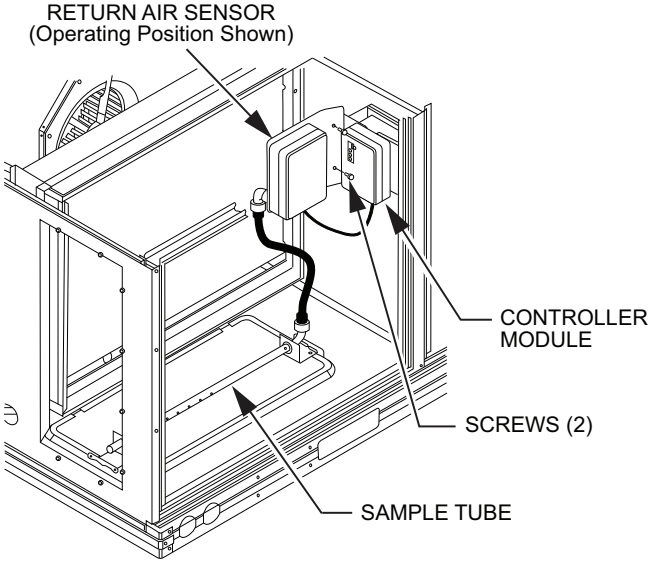


Fig. 53 — Return Air Sensor Operating Position

FIOP Smoke Detector Wiring and Response

ALL UNITS

FIOP smoke detector is configured to automatically shut down all unit operations when a smoke condition is detected. See Fig. 54, Smoke Detector Wiring.

HIGHLIGHT A

JMP 3 is factory-cut, transferring unit control to smoke detector.

HIGHLIGHT B

Smoke detector NC contact set will open on smoke alarm condition, de-energizing the ORN conductor.

HIGHLIGHT C

24V power signal using the ORN lead is removed at the Smoke Detector input on LCTB; all unit operations cease immediately.

PREMIERLINK™ AND RTU OPEN CONTROLS

Unit operating functions (fan, cooling and heating) are terminated as described above.

HIGHLIGHT D

On smoke alarm condition, the smoke detector NO Alarm contact will close, supplying 24-v power to GRA conductor.

HIGHLIGHT E

GRA lead at Smoke Alarm input on LCTB provides 24-v signal to FIOP DDC control.

PREMIERLINK

This signal is conveyed to PremierLink FIOP's TB1 at terminal TB1-6 (BLU lead). This signal initiates the FSD sequence by the PremierLink control. FSD status is reported to connected CCN network.

RTU OPEN

The 24-v signal is conveyed to RTU Open J1-10 input terminal. This signal initiates the FSD sequence by the RTU Open control. FSD status is reported to connected BAS network.

USING REMOTE LOGIC

Five conductors are provided for field use (see Highlight F) for additional annunciation functions.

ADDITIONAL APPLICATION DATA

Refer to "Factory Installed Smoke Detectors for Small and Medium Rooftop Units 2 to 25 Tons" for discussions on additional control features of these smoke detectors including multiple unit coordination. See Fig. 54.

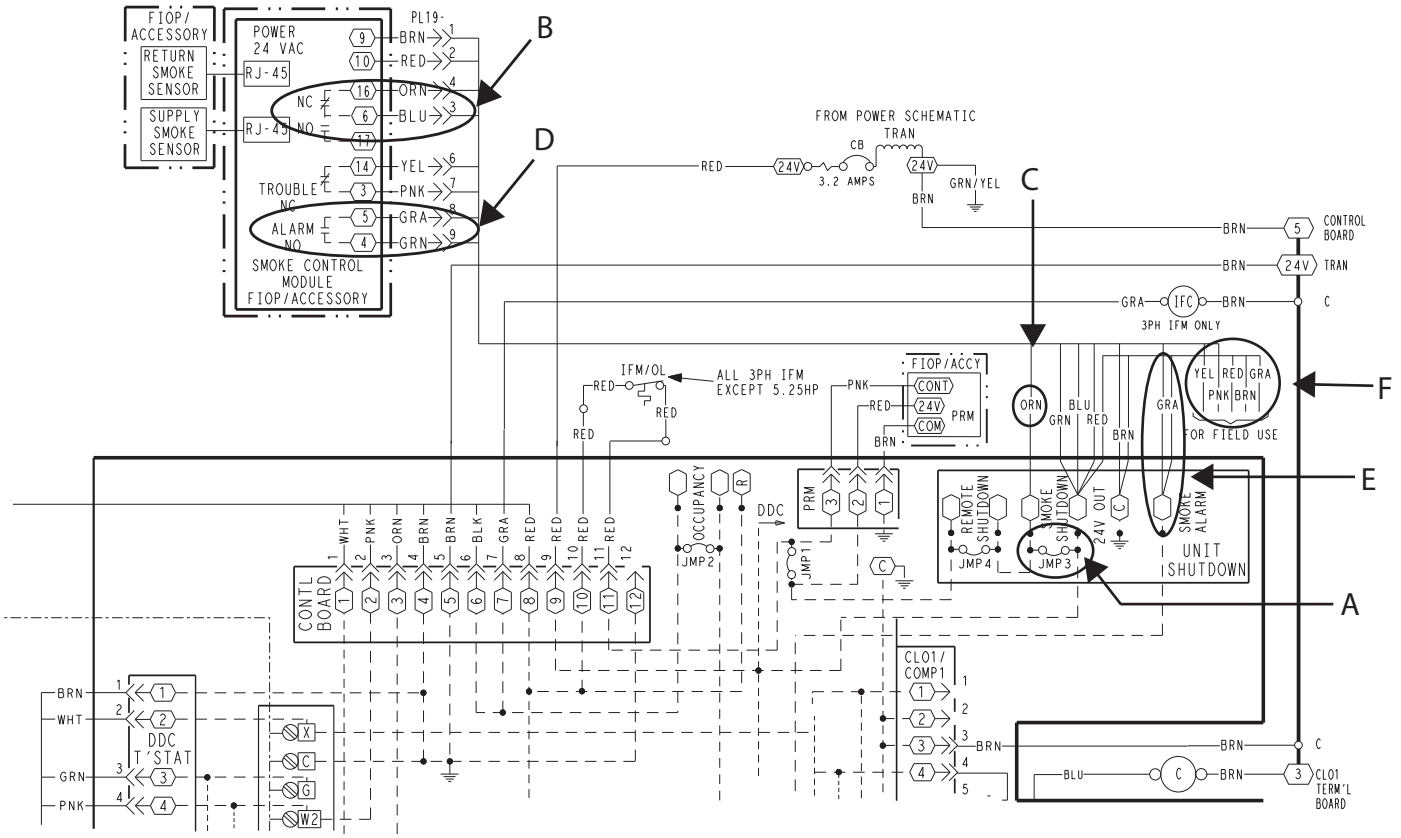


Fig. 54 — Typical Smoke Detector System Wiring

SENSOR AND CONTROLLER TESTS

Sensor Alarm Test

The sensor alarm test checks a sensor's ability to signal an alarm state. This test requires that you use a field provided SD-MAG test magnet.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

SENSOR ALARM TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for seven seconds.
2. Verify that the sensor's Alarm LED turns on.
3. Reset the sensor by holding the test magnet against the sensor housing for two seconds.
4. Verify that the sensor's Alarm LED turns off.

Controller Alarm Test

The controller alarm test checks the controller's ability to initiate and indicate an alarm state.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

CONTROLLER ALARM TEST PROCEDURE

1. Press the controller's test/reset switch for seven seconds.
2. Verify that the controller's Alarm LED turns on.
3. Reset the sensor by pressing the test/reset switch for two seconds.
4. Verify that the controller's Alarm LED turns off.

Dirty Controller Test

The dirty controller test checks the controller's ability to initiate a dirty sensor test and indicate its results.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Pressing the controller's test/reset switch for longer than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

DIRTY CONTROLLER TEST PROCEDURE

1. Press the controller's test/reset switch for two seconds.
2. Verify that the controller's Trouble LED flashes.

Dirty Sensor Test

The dirty sensor test provides an indication of the sensor's ability to compensate for gradual environmental changes. A sensor that can no longer compensate for environmental changes is considered 100% dirty and requires cleaning or replacing. You must use a field provided SD-MAG test magnet to initiate a sensor dirty test. The sensor's Dirty LED indicates the results of the dirty test as shown in Table 11.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Holding the test magnet against the sensor housing for more than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

Table 11 — Dirty LED Test

FLASHES	DESCRIPTION
1	0-25% dirty. (Typical of a newly installed detector)
2	25-50% dirty
3	51-75% dirty
4	76-99% dirty

DIRTY SENSOR TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for two seconds.
2. Verify that the sensor's Dirty LED flashes.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Changing the dirty sensor test operation will put the detector into the alarm state and activate all automatic alarm responses. Before changing dirty sensor test operation, disconnect all auxiliary equipment from the controller and notify the proper authorities if connected to a fire alarm system.

Changing the Dirty Sensor Test

By default, sensor dirty test results are indicated by:

- The sensor's Dirty LED flashing.
- The controller's Trouble LED flashing.
- The controller's supervision relay contacts toggle.

The operation of a sensor's dirty test can be changed so that the controller's supervision relay is not used to indicate test results. When two detectors are connected to a controller, sensor dirty test operation on both sensors must be configured to operate in the same manner.

CONFIGURE THE DIRTY SENSOR TEST OPERATION

1. Hold the test magnet where indicated on the side of the sensor housing until the sensor's Alarm LED turns on and its Dirty LED flashes twice (approximately 60 seconds).
2. Reset the sensor by removing the test magnet then holding it against the sensor housing again until the sensor's Alarm LED turns off (approximately 2 seconds).

Remote Station Test

The remote station alarm test checks a test/reset station's ability to initiate and indicate an alarm state.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Holding the test magnet against the sensor housing for more than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

SD-TRK4 Remote Alarm Test Procedure

1. Turn the key switch to the RESET/TEST position for seven seconds.
2. Verify that the test/reset station's Alarm LED turns on.
3. Reset the sensor by turning the key switch to the RESET/TEST position for two seconds.
4. Verify that the test/reset station's Alarm LED turns off.

Remote Test/Reset Station Dirty Sensor Test

The test/reset station dirty sensor test checks the test/reset station's ability to initiate a sensor dirty test and indicate the results. It must be wired to the controller as shown in Fig. 55 and configured to operate the controller's supervision relay. For more information, see "Changing sensor dirty test operation."

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

Holding the test magnet against the sensor housing for more than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

Dirty Sensor Test Using an SD-TRK4

1. Turn the key switch to the RESET/TEST position for two seconds.
2. Verify that the test/reset station's Trouble LED flashes.

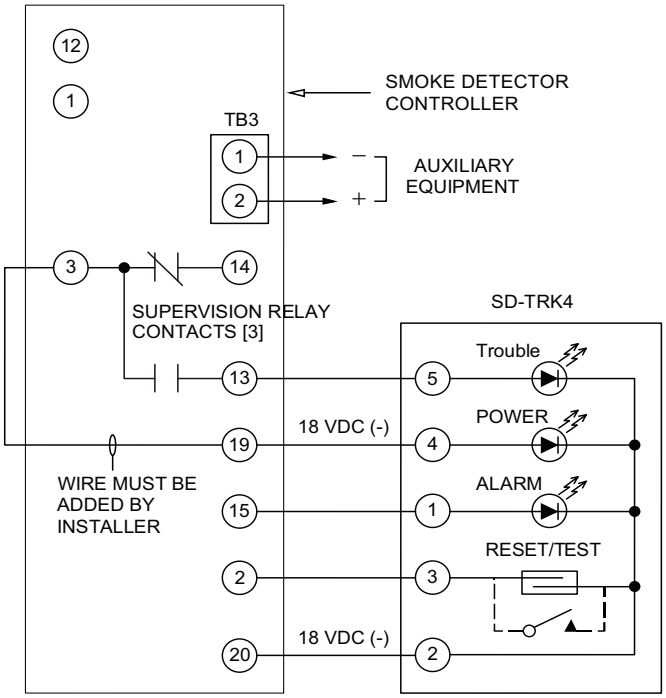


Fig. 55 — Remote Test/Reset Station Connections

Detector Cleaning

CLEANING THE SMOKE DETECTOR

Clean the duct smoke sensor when the Dirty LED is flashing continuously or sooner if conditions warrant.

NOTICE

OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

If the smoke detector is connected to a fire alarm system, first notify the proper authorities that the detector is undergoing maintenance, then disable the relevant circuit to avoid generating a false alarm.

1. Disconnect power from the duct detector then remove the sensor's cover. See Fig. 56.
2. Using a vacuum cleaner, clean compressed air, or a soft bristle brush, remove loose dirt and debris from inside the sensor housing and cover. Use isopropyl alcohol and a lint-free cloth to remove dirt and other contaminants from the gasket on the sensor's cover.
3. Squeeze the retainer clips on both sides of the optic housing.
4. Lift the housing away from the printed circuit board.
5. Gently remove dirt and debris from around the optic plate and inside the optic housing.
6. Replace the optic housing and sensor cover.
7. Connect power to the duct detector then perform a sensor alarm test.

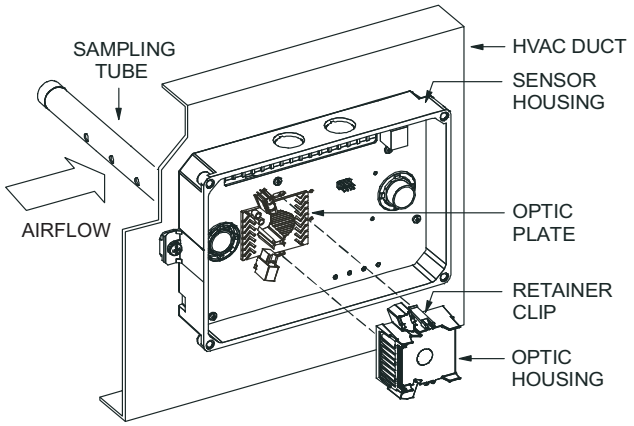


Fig. 56 — Sensor Cleaning Diagram

Indicators

NORMAL STATE

The smoke detector operates in the normal state in the absence of any trouble conditions and when its sensing chamber is free of smoke. In the normal state, the Power LED on both the sensor and the controller are on and all other LEDs are off.

ALARM STATE

The smoke detector enters the alarm state when the amount of smoke particulate in the sensor's sensing chamber exceeds the alarm threshold value. See Table 12. Upon entering the alarm state:

- The sensor's Alarm LED and the controller's Alarm LED turn on.
- The contacts on the controller's two auxiliary relays switch positions.
- The contacts on the controller's alarm initiation relay close.
- The controller's remote alarm LED output is activated (turned on).
- The controller's high impedance multiple fan shutdown control line is pulled to ground Trouble state.

Table 12 — Detector Indicators

CONTROL OR INDICATOR	DESCRIPTION
Magnetic test/ reset switch	Resets the sensor when it is in the alarm or trouble state. Activates or tests the sensor when it is in the normal state.
Alarm LED	Indicates the sensor is in the alarm state.
Trouble LED	Indicates the sensor is in the trouble state.
Dirty LED	Indicates the amount of environmental compensation used by the sensor (flashing continuously = 100%)
Power LED	Indicates the sensor is energized.

The SuperDuct™ duct smoke detector enters the trouble state under the following conditions:

- A sensor's cover is removed and 20 minutes pass before it is properly secured.
- A sensor's environmental compensation limit is reached (100% dirty).
- A wiring fault between a sensor and the controller is detected.

An internal sensor fault is detected upon entering the trouble state:

- The contacts on the controller's supervisory relay switch positions. See Fig. 57.
- If a sensor trouble, the sensor's Trouble LED the controller's Trouble LED turn on.
- If 100% dirty, the sensor's Dirty LED turns on and the controller's Trouble LED flashes continuously.
- If a wiring fault between a sensor and the controller, the controller's Trouble LED turns on but not the sensor's.

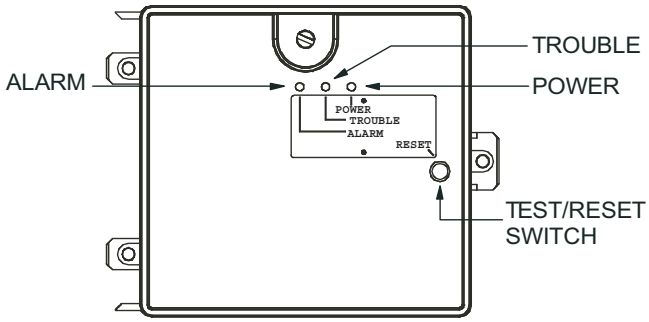


Fig. 57 — Controller Assembly

NOTE: All troubles are latched by the duct smoke detector. The trouble condition must be cleared and then the duct smoke detector must be reset in order to restore it to the normal state.

RESETTING ALARM AND TROUBLE CONDITION TRIPS

Manual reset is required to restore smoke detector systems to Normal operation. For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition. Check each sensor for Alarm or Trouble status (indicated by LED). Clear the condition that has generated the trip at this sensor. Then reset the sensor by pressing and holding the reset button (on the side) for 2 seconds. Verify that the sensor's Alarm and Trouble LEDs are now off. At the controller, clear its Alarm or Trouble state by pressing and holding the manual reset button (on the front cover) for 2 seconds. Verify that the controller's Alarm and Trouble LEDs are now off. Replace all panels.

Troubleshooting

CONTROLLER'S TROUBLE LED IS ON

1. Check the Trouble LED on each sensor connected to the controller. If a sensor's Trouble LED is on, determine the cause and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

CONTROLLER'S TROUBLE LED IS FLASHING

1. One or both of the sensors is 100% dirty.
2. Determine which Dirty LED is flashing then clean that sensor assembly as described in the detector cleaning section.

SENSOR'S TROUBLE LED IS ON

1. Check the sensor's Dirty LED. If it is flashing, the sensor is dirty and must be cleaned.
2. Check the sensor's cover. If it is loose or missing, secure the cover to the sensor housing.
3. Replace sensor assembly.

SENSOR'S POWER LED IS OFF

1. Check the controller's Power LED. If it is off, determine why the controller does not have power and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

CONTROLLER'S POWER LED IS OFF

1. Make sure the circuit supplying power to the controller is operational. If not, make sure JP2 and JP3 are set correctly on the controller before applying power.
2. Verify that power is applied to the controller's supply input terminals. If power is not present, replace or repair wiring as required.

REMOTE TEST/RESET STATION'S TROUBLE LED DOES NOT FLASH WHEN PERFORMING A DIRTY TEST, BUT THE CONTROLLER'S TROUBLE LED DOES

1. Verify that the remote test/station is wired as shown in Fig. 55. Repair or replace loose or missing wiring.
2. Configure the sensor dirty test to activate the controller's supervision relay. See "Changing sensor dirty test operation."

SENSOR'S TROUBLE LED IS ON, BUT THE CONTROLLER'S TROUBLE LED IS OFF

Remove JP1 on the controller.

SUPPLY AIR TEMPERATURE (SAT) SENSOR

On FIOP-equipped 50HCQ units, the unit is supplied with a supply-air temperature (SAT) sensor (P/N 33ZCSENSAT). This sensor is a tubular probe type, approx. 6 in. (12.7 mm) in length. It is a nominal 10k-ohm thermistor. See "PremierLink™ Installation, Start-Up and Configuration Instructions" for temperature-resistance characteristics.

PREMIERLINK™ CONTROL

The PremierLink controller (see Fig. 58) is compatible with Carrier Comfort Network® (CCN) devices. This control is designed to allow users the access and ability to change factory-defined settings, thus expanding the function of the standard unit control board. CCN service access tools include System Pilot™, Touch Pilot™ and Service Tool. Standard tier display tools Navigator™ and Scrolling Marquee are not suitable for use with the latest PremierLink controller (Version 2.x).

The PremierLink controller is factory-mounted in the unit's main control box to the left of the LCTB. Factory wiring is completed through harnesses connected to the LCTB thermostat. Field connections are made at a 16-pole terminal block (TB1) located on the bottom shelf of the unit control box in front of the PremierLink controller. The factory-installed PremierLink control includes the supply-air temperature (SAT) sensor. The outdoor air temperature (OAT) sensor is included in the FIOP/accessory EconoMi$er 2 package.

Refer to Fig. 58 for PremierLink connection locations.

NOTE: Refer to PremierLink™ Installation, Start-Up and Configuration Instructions. Have a copy of this manual available at unit start-up.

RTU OPEN CONTROL SYSTEM

The RTU Open controller is an integrated component of the Carrier rooftop unit. Its internal application programming provides optimum performance and energy efficiency. RTU Open enables the unit to run in 100% stand-alone control mode, Carrier's i-Vu® Open network, or a Third Party Building Automation System (BAS). On-board DIP switches allow you to select your protocol (and baud rate) of choice among the four most popular protocols in use today: BACnet[1], Modbus[2], Johnson N2 and LonWorks[3]. See Fig. 59.

Carrier's diagnostic display tools such as Field Assistant BACview6 Handheld or Virtual BACview[4] can be used with the RTU Open controller. Access is available via a 5-pin J12 access port.

The RTU-Open control is factory-mounted in the unit's main control box, to the left of the Light Commercial Terminal Board (LCTB). Factory wiring is completed through harnesses connected to the LCTB. Field connections for RTU Open sensors will be made at the Phoenix connectors on the RTU Open board. The factory-installed RTU Open control includes the supply-air temperature (SAT) sensor. The outdoor air temperature (OAT) sensor is included in the FIOP/accessory EconoMi$er2 package.

Sensor/Accessory Installation

A variety of sensors and accessories are available for the RTU Open Controller. Some of these can be factory or field installed, while others are only field installable. The RTU Open controller may also require connection to a building network system or building zoning system. All field control wiring that connects to the RTU Open Controller must be routed through the raceway built into the corner post of the unit or secured to the unit control box with electrical conduit. The unit raceway provides the UL required clearance between high and low-voltage wiring. Pass the control wires through the hole provided in the corner post, then feed the wires thorough the raceway to the RTU Open Controller. Connect the wires to the removable Phoenix connectors and then reconnect the connectors to the board.

IMPORTANT: Refer to the specific sensor or accessory instructions for its proper installation and for rooftop unit installation refer to base unit installation instructions and the unit's wiring diagrams.

1. BACnet is a registered trademark of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers).
2. Modbus is a registered trademark of Schneider Electric.
3. LonWorks is a registered trademark of Echelon Corporation.
4. BACview is a registered trademark of Automated Logic Corporation.

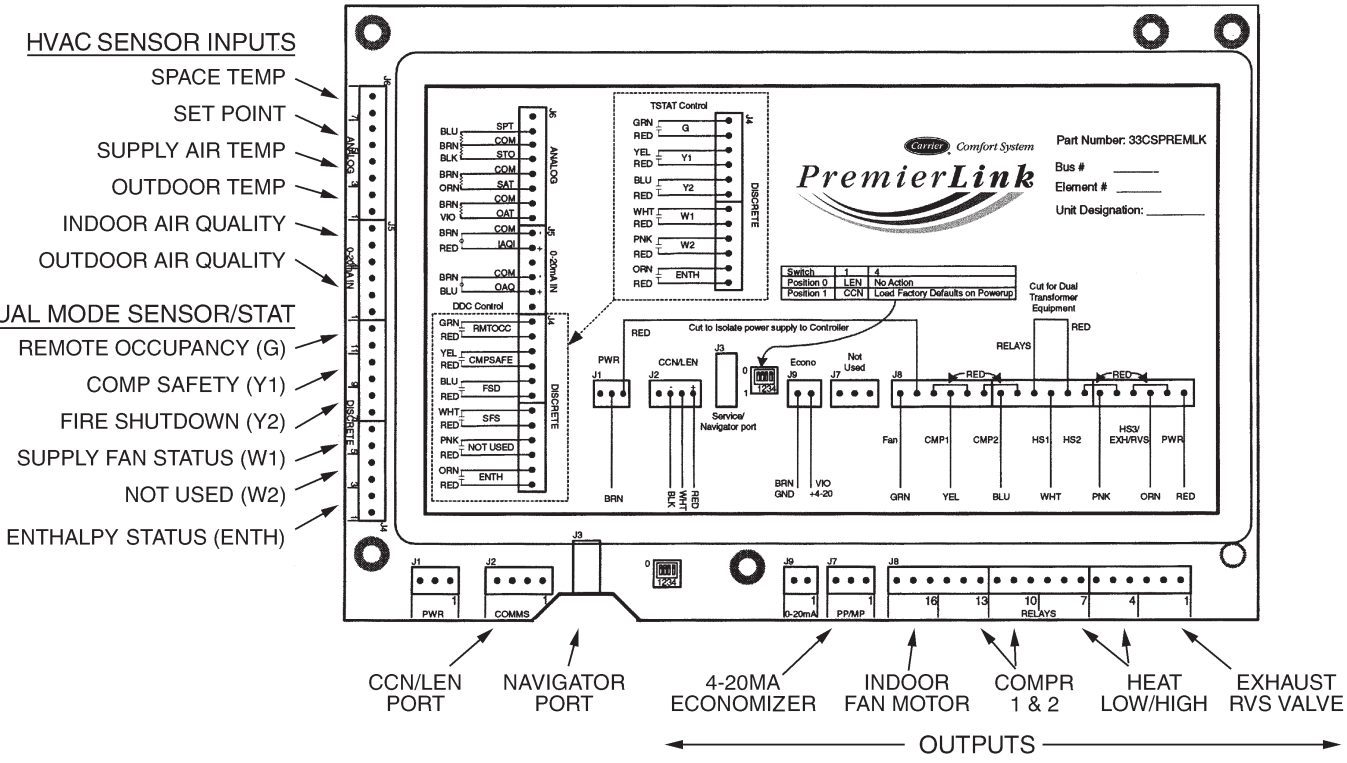


Fig. 58 — PremierLink™ Controller

⚠ WARNING

Electrical shock can cause personal injury and death. Shut off all power to this equipment during installation. There may be more than one disconnect switch. Tag all disconnect locations to alert others not to restore power until work is completed.

Additional RTU Open Installation and Troubleshooting

Refer to the following manuals: "Controls, Start-up, Operation and Troubleshooting Instructions," and "RTU Open Installation and Start-up Guide" for additional installation, wiring and troubleshooting information for the RTU Open Controller. Have a copy of these manuals available at unit start-up.

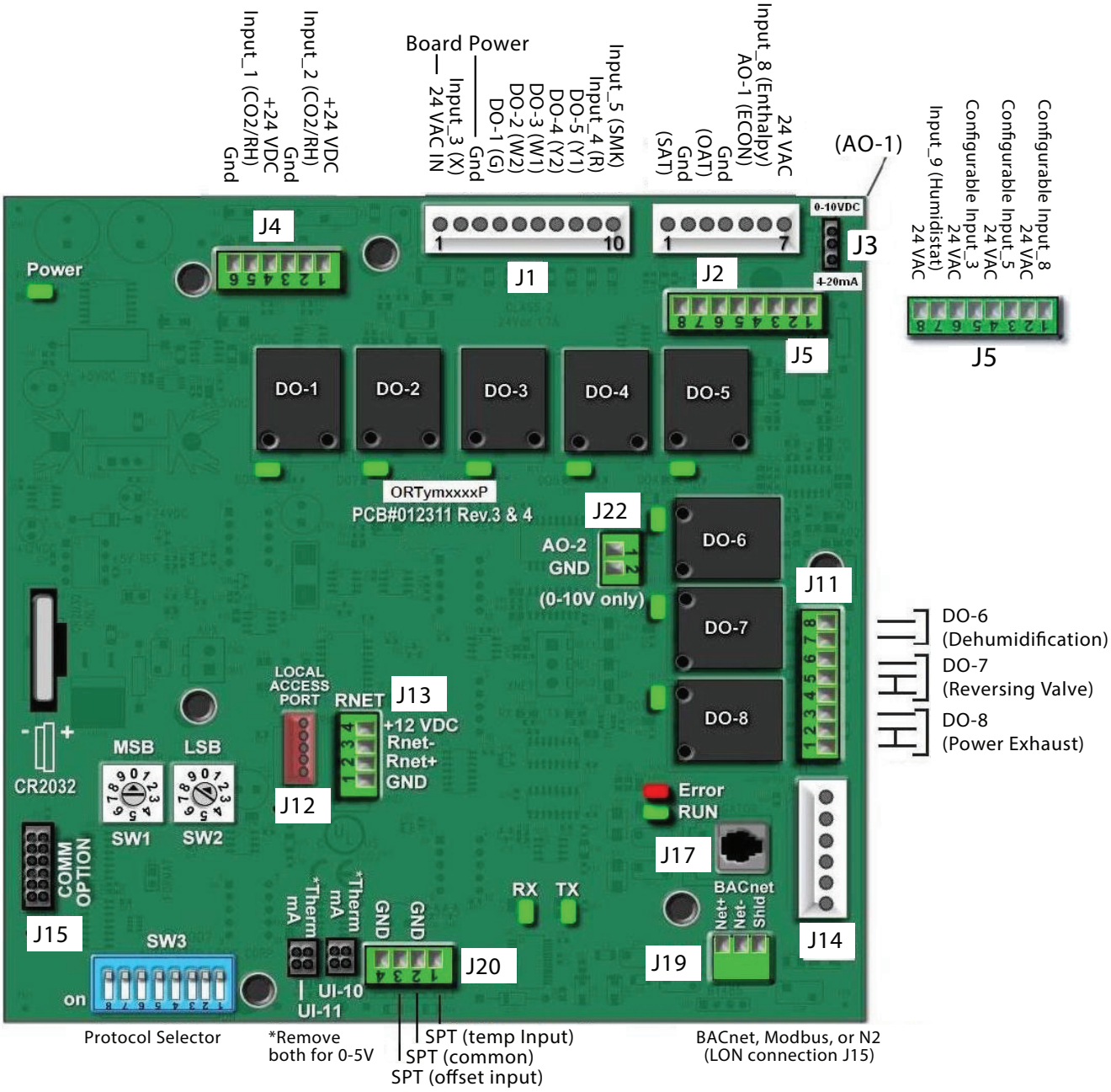


Fig. 59 — RTU Open Control Module

PRE-START-UP/START-UP

⚠ WARNING

PERSONAL INJURY HAZARD

Failure to follow this warning could result in personal injury or death.

1. Follow recognized safety practices and wear approved Personal Protective Equipment (PPE), including safety glasses and gloves when checking or servicing refrigerant system.
2. Do not use a torch to remove any component. System contains oil and refrigerant under pressure. To remove a component, wear PPE and proceed as follows:
   a. Shut off all electrical power to unit. Apply applicable lockout/tag-out procedures.
   b. Recover refrigerant to relieve all pressure from system using both high-pressure and low pressure ports.
   c. Do not use a torch. Cut component connection tubing with tubing cutter and remove component from unit.
   d. Carefully un-sweat remaining tubing stubs when necessary. Oil can ignite when exposed to torch flame.
3. Do not operate compressor or provide any electric power to unit unless compressor terminal cover is in place and secured.
4. Do not remove compressor terminal cover until all electrical power is disconnected and approved lockout/tag-out procedures are in place.
5. Relieve all pressure from system before touching or disturbing anything inside terminal box whenever refrigerant leak is suspected around compressor terminals.
6. Never attempt to repair a soldered connection while refrigerant system is under pressure.

⚠ WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (American National Standards Institute/National Fire Protection Association.

Proceed as follows to inspect and prepare the unit for initial start-up:

1. Remove all access panels.
2. Read and follow instructions on all WARNING, CAUTION, and INFORMATION labels attached to, or shipped with, unit.
3. Perform the following inspections:
   a. Inspect for shipping and handling damages such as broken lines, loose parts, or disconnected wires, etc.
   b. Inspect for oil at all refrigerant tubing connections and on unit base. Detecting oil generally indicates a refrigerant leak. Leak-test all refrigerant tubing connections using electronic leak detector, halide torch, or liquid-soap solution.
   c. Inspect all field-wiring and factory-wiring connections. Be sure that connections are completed and tight. Be sure that wires are not in contact with refrigerant tubing or sharp edges.
   d. Inspect coil fins. If damaged during shipping and handling, carefully straighten fins with a fin comb.
4. Verify the following conditions:
   a. Make sure that condenser-fan blade are correctly positioned in fan orifice. See Condenser-Fan Adjustment section for more details.
   b. Make sure that air filter(s) is in place.
   c. Make sure that condensate drain trap is filled with water to ensure proper drainage.
   d. Make sure that all tools and miscellaneous loose parts have been removed.

START-UP, GENERAL

IMPORTANT: Follow the base unit's start-up sequence as described in the unit's installation instructions:

In addition to the base unit start-up, there are a few steps needed to properly start up the controls. RTU Open Controller's Service Test function should be used to assist in the base unit start-up and also allows verification of output operation. Controller configuration is also part of start-up. This is especially important when field accessories have been added to the unit. The factory pre-configures options installed at the factory. There may also be additional installation steps or inspection required during the start-up process.

Unit Preparation

Make sure that unit has been installed in accordance with installation instructions and applicable codes.

Additional Installation/Inspection

Inspect the field installed accessories for proper installation, making note of which ones do or do not require configuration changes. Inspect the RTU Open Controller's Alarms for initial insight to any potential issues. Refer to the following manual: "Controls, Start-up, Operation and Troubleshooting Instructions." Inspect the SAT sensor for relocation as intended during installation. Inspect special wiring as directed below.

Return-Air Filters

Ensure correct filters are installed in unit (see Appendix B — Physical Data on page 40). Do not operate unit without return-air filters in place.

Outdoor-Air Inlet Screens

Outdoor-air inlet screen must be in place before operating unit.

Compressor Mounting

Compressors are internally spring mounted. Do not loosen or remove compressor hold down bolts.

Internal Wiring

Check all electrical connections in unit control boxes. Tighten as required.

Compressor Rotation

⚠CAUTION

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution can result in premature wear and damage to equipment.

Scroll compressors can only compress refrigerant if rotating in the right direction. Reverse rotation for extended times can result in internal damage to the compressor. Scroll compressors are sealed units and cannot be repaired on site location.

On 3-phase units with scroll compressors, it is important to be certain compressor is rotating in the proper direction. To determine whether or not compressor is rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit and install lockout tag.
3. Reverse any two of the unit power leads.
4. Re-energize to the compressor. Check pressures.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When the compressor is rotating in the wrong direction, the unit will make an elevated level of noise and will not provide cooling.

Cooling

Set space thermostat to OFF position. To start unit, turn on main power supply. Set system selector switch at COOL position and fan switch at AUTO position. Adjust thermostat to a setting below room temperature. Compressor starts on closure of contactor. (D08–12: Second stage of thermostat will energize Circuit 2 contactor, start Compressor 2.)

Check unit charge. Refer to Refrigerant Charge section on page 11.

Reset thermostat at a position above room temperature. Compressor will shut off. Evaporator fan will shut off after a 30-second delay if the dip switch for the indoor fan off delay on the Defrost Control Board (DFB) is set to on.

To shut off unit, set system selector switch at OFF position. Resetting thermostat at a position above room temperature shuts unit off temporarily until space temperature exceeds thermostat setting.

Heating

To start unit, turn on main power supply.

Set system selector switch to the HEAT position and set thermostat at a setting above room temperature. Set fan to AUTO position.

First stage of thermostat energizes compressor heating (D08-12: both compressors will start). Second stage of thermostat energizes electric heaters (if installed). Check heating effects at air supply grille(s).

If electric heaters do not energize, reset limit switch (located on supply-fan scroll) by pressing button located between terminals on the switch.

To shut unit off, set system selector switch to the OFF position. Resetting thermostat at a position below room temperature temporarily shuts unit off until space temperature falls below thermostat setting.

Ventilation (Continuous Fan)

Set fan and system selector switches at ON and OFF positions, respectively. Evaporator fan operates continuously to provide constant air circulation. When the evaporator-fan selector switch is turned to the OFF position, there is a 30-second delay before the fan turns off.

START-UP, PREMIERLINK™ CONTROLLER

⚠WARNING

ELECTRICAL OPERATION HAZARD

Failure to follow this warning could result in personal injury or death.

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (American National Standards Institute/National Fire Protection Association.

Use the Carrier network communication software to start up and configure the PremierLink controller.

Changes can be made using the ComfortWORKS™ software, ComfortVIEW™ software, Network Service Tool™, System Pilot™ device, or Touch Pilot™ device. The System Pilot and Touch Pilot are portable interface devices that allow the user to change system set-up and set points from a zone sensor or terminal control module. During start-up, the Carrier software can also be used to verify communication with PremierLink controller.

NOTE: All set-up and set point configurations are factory set and field-adjustable.

For specific operating instructions, refer to the literature provided with user interface software.

NOTICE

SET-UP INSTRUCTIONS

All set-up and set point configurations are factory set and field-adjustable.

Refer to PremierLink™ Installation, Start-Up and Configuration Instructions for specific operating instructions for the controller. Have a copy of this manual available at unit start-up.

Perform System Check-Out

1. Check correctness and tightness of all power and communication connections.
2. At the unit, check fan and system controls for proper operation.
3. At the unit, check electrical system and connections of any optional electric reheat coil.
4. Check to be sure the area around the unit is clear of construction dirt and debris.
5. Check that final filters are installed in the unit. Dust and debris can adversely affect system operation.
6. Verify that the PremierLink controls are properly connected to the CCN bus.

START-UP, RTU OPEN CONTROLS

NOTICE

SET-UP INSTRUCTIONS

Installation, wiring and troubleshooting information for the RTU-OPEN Controller: “Controls, Start-up, Operation and Troubleshooting Instructions,” “RTU Open Installation and Start-up Guide” and “RTU-Open Integration Guide”. Have a copy of these manuals available at unit start-up.

FASTENER TORQUE VALUES

Refer to Table 13.

Table 13 — Torque Values

FASTENER	TORQUE	
Supply fan motor mounting	120 ± 12 in.-lbs	13.6 ± 1.4 Nm
Supply fan motor adjustment plate	120 ± 12 in.-lbs	13.6 ± 1.4 Nm
Motor pulley setscrew	72 ± 5 in.-lbs	8.1 ± 0.6 Nm
Fan pulley setscrew	72 ± 5 in.-lbs	8.1 ± 0.6 Nm
Blower wheel hub setscrew	72 ±5 in.-lbs	8.1 ±0.6 Nm
Bearing locking collar setscrew	55 to60 in.-lbs	6.2 to 6.8 Nm
Compressor mounting bolts	65 to75 in.-lbs	7.3 to 7.9 Nm
Condenser fan motor mounting bolts	65 to75 in.-lbs	7.3 to 7.9 Nm
Condenser fan motor mounting bolts	20 ± 2 in.-lbs	2.3 ± 0.2 Nm
Condenser fan hub setscrew	84 ± 12 in.-lbs	9.5 ± 1.4 Nm
A04-06 Direct-Drive Motor mount arm	60 ± 5 in.-lbs	6.8 ± 0.5 Nm
A04-06 Direct-Drive Fan wheel hub setscrew	120 ± 12 in.-lbs	13.6 ± 1.4 Nm
A04-06 Direct-Drive Motor belly band bolt	80 ± 5 in.-lbs	9.0 ± 0.6 Nm

APPENDIX A — MODEL NUMBER NOMENCLATURE

Position:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Example:	5	0	H	C	Q	A	0	6	A	0	A	6	–	0	B	2	A	0

Series - WeatherMaster®
50HC - Packaged Rooftop - High Efficiency

Q = Heat Pump

Refrig. Systems Options
A = One Stage Cooling Models
D = Two Stage Cooling Models

Cooling Tons
04 - 3 ton
05 - 4 ton
06 - 5 ton
07 - 6 ton
08 - 7.5 ton
09 - 8.5 ton
12 - 10 ton

Sensor Options
A = None
B = RA Smoke Detector
C = SA Smoke Detector
D = RA + SA Smoke Detector
E = CO_2
F = RA Smoke Detector and CO_2
G = SA Smoke Detector and CO_2
H = RA + SA Smoke Detector and CO_2

Indoor Fan Options
0 = Electric Drive X13 Motor (04-06)
1 = Standard Static Option - Belt Drive
2 = Medium Static Option - Belt Drive
3 = High Static Option - Belt Drive
C = High Static Option with High Efficiency Motor- Belt Drive (size 12 only)

Coil Options - Round Tube/Plate Fin Condenser Coil (Outdoor - Indoor - Hail Guard)
A = Al/Cu - Al/Cu
B = Precoat Al/Cu - Al/Cu
C = E-coat Al/Cu - Al/Cu
D = E-coat Al/Cu - E-coat Al/Cu
E = Cu/Cu - Al/Cu
F = Cu/Cu - Cu/Cu
M = Al/Cu -Al/Cu — Louvered Hail Guard
N = Precoat Al/Cu - Al/Cu — Louvered Hail Guard
P = E-coat Al/Cu - Al/Cu — Louvered Hail Guard
Q = E-coat Al/Cu - E-coat Al/Cu — Louvered Hail Guard
R = Cu/Cu - Al/Cu — Louvered Hail Guard
S = Cu/Cu - Cu/Cu — Louvered Hail Guard

Note: On single phase (-3 voltage code) models, the following are not available as a factory installed option:
- Coated Coils or Cu Fin Coils
- Louvered Hail Guards
- Economizer or 2 Position Damper
- Powered 115 Volt Convenience Outlet

Factory Assigned
0 = Standard
1 = LTL

Electrical Options
A = None
C = Non-Fused Disconnect
D = Thru-The-Base Connections
F = Non-Fused Disconnect and Thru-The-Base Connections
G = 2-Speed Indoor Fan Controller (VFD)
J = 2-Speed Indoor Fan Controller (VFD) and Non-Fused Disconnect
K = 2-Speed Indoor Fan Controller (VFD) and Thru-The-Base Connections
M = 2-Speed Indoor Fan Controller (VFD) with Non-Fused Disconnect and Thru-The-Base Connections

Service Options
0 = None
1 = Unpowered Convenience Outlet
2 = Powered Convenience Outlet
3 = Hinged Access Panels
4 = Hinged Access Panels and Unpowered Convenience Outlet
5 = Hinged Panels and Powered Convenience Outlet

Intake / Exhaust Options
A = None
B = Temperature Economizer w/ Barometric Relief
F = Enthalpy Economizer w/ Barometric Relief
K = 2-Position Damper
U = Temperature Ultra Low Leak Economizer w/ Barometric Relief
W = Enthalpy Ultra Low Leak Economizer w/ Barometric Relief

Base Unit Controls
0 = Electro-mechanical Controls can be used with W7212 EconoMi$er IV (Non-Fault Detection and Diagnostic)
1 = PremierLink Controller
2 = RTU Open Multi-Protocol Controller
6 = Electro-mechanical w/ 2-speed fan and W7220 Economizer controller Controls. Can be used with W7220 EconoMi$er X (with Fault Detection and Diagnostic)

Design Revision
– = Factory Design Revision

Voltage
1 = 575/3/60
3 = 208-230/1/60
5 = 208-230/3/60
6 = 460/3/60

Serial Number Format

POSITION	1	2	3	4	5	6	7	8	9	10
TYPICAL	0	4	0	9	G	1	2	3	4	5

POSITION	DESIGNATES
1-2	Week of manufacture (fiscal calendar)
3-4	Year of manufacture (“08” = 2008)
5	Manufacturing location (G = CMX-C, Monterey, Mexico)
6-10	Sequential number

Fig. A — Model Number Nomenclature

APPENDIX B — PHYSICAL DATA

Table A — Physical Data (Cooling) 3-6 Tons

		50HCQA04	50HCQA05	50HCQA06	50HCQA07	50HCQD07
REFRIGERATION SYSTEM						
# Circuits / # Comp. / Type		1 / 1 / Scroll	1 / 1 / Scroll	1 / 1 / 1-Stage Scroll	1 / 1 / 1-Stage Scroll	1 / 1 / 2-Stage Scroll
Puron® (R-410A) Refrigerant Charge per circuit A/B (lbs-oz)		12 - 8 / -	15 - 8 / -	17 - 8 / -	15 - 8/ -	15 - 8 / -
Metering device		TXV	TXV	TXV	TXV	TXV
High-press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505	630 / 505	630 / 505
Loss of Charge Press. Trip / Reset (psig)		27 / 44	27 / 44	27 / 44	27 / 44	27 / 44
EVAP. COIL						
Material - Tube / Fin		Cu / Al	Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil Type (Tube Dia.)		3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF
Rows / FPI		3 / 15	3 / 15	3 / 15	3 / 15	3 / 15
Total face area (ft^2)		5.5	7.3	7.3	8.9	8.9
Condensate drain conn. size		3/4-in.	3/4-in.	3/4-in.	3/4-in.	3/4-in.
EVAPORATOR FAN AND MOTOR						
Standard Static 1-Phase	Motor Qty. / Driver Type	1 / Direct	1 / Direct	1 / Direct	N/A	N/A
	Max BHP	1.0	1.0	1.0	N/A	N/A
	RPM range	600-1200	600-1200	600-1200	N/A	N/A
	Motor frame size	48	48	48	N/A	N/A
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	N/A	N/A
	Fan Dia. x Length (in.)	10 x 10	10 x 10	10 x 11	N/A	N/A
Standard Static 3-Phase	Motor Qty. / Driver Type	1 / Direct	1 / Direct	1 / Direct	1 / Belt	1 / Belt
	Max BHP	1.0	1.0	1.0	1.2	1.2
	RPM range	600-1200	600-1200	600-1200	489-747	489-652
	Motor frame size	48	48	48	56	56
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	10 x 10	10 x 10	11 x 10	15 x 15	15 x 15
Medium Static 3-Phase	Motor Qty. / Driver Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.5	1.5	2.0	2.9	2.9
	RPM range	819-1251	920-1303	1066-1380	733-949	591-838
	Motor frame size	56	56	56	56	56
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	10 x 10	10 x 10	10 x 10	15 x 15	15 x 15
High Static 3-Phase	Motor Qty. / Driver Type	1 / Belt	1 / Belt	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.0	2.0	2.9	4.0	2.9
	RPM range	1035-1466	1035-1466	1208-1550	909-1102	838-1084
	Motor frame size	56	56	56	45	145
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	10 x 10	10 x 10	10 x 10	15 x 15	15 x 15
CONDENSER COIL						
Material (Tube/Fin)		Cu / Al	Cu / Al	Cu / Al	Cu / Al	Cu / Al
Coil type		3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF
Rows / FPI		2 / 17	2 / 17	2 / 17	2 / 17	2 / 17
Total Face Area (ft^2)		16.5	21.3	21.3	20.5	20.5
COND. FAN / MOTOR						
Qty / Motor Drive Type		1 / direct	1 / direct	1 / direct	2 / direct	2 / direct
Motor HP / RPM		1/8 / 825	1/4 / 1100	1/4 / 1100	1/4 / 1100	1/4 / 1100
Fan diameter (in.)		22	22	22	22	22
FILTERS						
RA Filter # / Size (in.)		2 / 16 x 25 x 2	4 / 16 x 16 x 2	4 / 16 x 16 x 2	4 / 16 x 20 x 2	4 / 16 x 20 x 2
OA inlet screen # / Size (in.)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 24 x 1	1 / 20 x 36 x 1	1 / 20 x 36 x 1

APPENDIX B — PHYSICAL DATA (cont)

Table B — Physical Data (Cooling) — 7.5-10 Tons

		50HCQD08	50HCQD09	50HCQD12
REFRIGERATION SYSTEM				
# Circuits / # Comp. / Type		2 / 2 / Scroll	2 / 2 / Scroll	2 / 2 / Scroll
Puron® (R-410A) Refrigerant Charge per circuit A/B (lbs-oz)		11 - 12 / 11 - 12	14-1/14-4	16-3/17-3
Metering device		TXV	TXV	TXV
High-press. Trip / Reset (psig)		630 / 505	630 / 505	630 / 505
Loss of Charge Press. Trip / Reset (psig)		27 / 44	27 / 44	27 / 44
Compressor Capacity Staging (%)		50 / 100	50 / 100	50 / 100
EVAP. COIL				
Material - Tube / Fin		Cu / Al	Cu / Al	Cu / Al
Coil Type (Tube Dia.)		3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF
Rows / FPI		4 / 15	4 / 15	3 / 15
Total face area (ft^2)		11.1	11.1	17.3
Condensate drain conn. size		3/4-in.	3/4-in.	3/4-in.
EVAPORATOR FAN AND MOTOR				
Standard Static 3-Phase	Motor Qty. / Driver Type	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.2	1.7	1.9
	RPM range	518-733	460-652	440-609
	Motor frame size	56	56	56
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	15 x 15	15 x 15	18 x 18
Medium Static 3-Phase	Motor Qty. / Driver Type	1 / Belt	1 / Belt	1 / Belt
	Max BHP	1.7	2.9	2.9
	RPM range	690-936	591-838	547-757
	Motor frame size	56	56	56
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	15 X 15	15 X 15	18 x 18
High Static 3-Phase	Motor Qty. / Driver Type	1 / Belt	1 / Belt	1 / Belt
	Max BHP	2.8	2.8	6.1
	RPM range	838-1084	838-1084	762-963
	Motor frame size	56	56	S184T
	Fan Qty. / Type	1 / Centrifugal	1 / Centrifugal	1 / Centrifugal
	Fan Dia. x Length (in.)	15 X 15	15 X 15	18 x 18
High Static High Efficiency 3-Phase	Motor Qty. / Driver Type	—	—	1 / Belt
	Max BHP	—	—	6.5/6.9/7.0/8.3*
	RPM range	—	—	762-963
	Motor frame size	—	—	S184T
	Fan Qty. / Type	—	—	1 / Centrifugal
	Fan Dia. x Length (in.)	—	—	18 x 18
CONDENSER COIL				
Material (Tube/Fin)		Cu / Al	Cu / Al	Cu / Al
Coil type		3/8-in. RTPF	3/8-in. RTPF	3/8-in. RTPF
Rows / FPI		2 / 17	3 / 17	2 / 17
Total Face Area (ft^2)		25.1	25.1	46.2
COND. FAN / MOTOR				
Qty / Motor Drive Type		2 / direct	1 / direct	3 / direct
Motor HP / RPM		1/4 / 1100	1 / 1175	1 / 1100
Fan diameter (in.)		22	30	22
FILTERS				
RA Filter # / Size (in.)		4 / 20 x 20 x 2	4 / 20 x 20 x 2	6 / 18 x 24 x 2
OA inlet screen # / Size (in.)		1 / 20 x 24 x 1	1 / 20 x 24 x 1	2 / 24 x 27 x 1 (Vert) 1 / 30 x 39 x 1 (Horiz)

* On Size 12 units, Max BHP for the High Static motor varies with the motor's voltage; see the table below.

Voltage	BHP
208	6.5
230	6.9
460	7.0
575	8.3

APPENDIX C — FAN PERFORMANCE

General Fan Performance Notes:

1. Interpolation is permissible. Do not extrapolate.
2. External static pressure is the static pressure difference between the return duct and the supply duct plus the static pressure caused by any FIOPs or accessories.
3. Tabular data accounts for pressure loss due to clean filters, unit casing, and wet coils. Factory options and accessories can add static pressure losses.
4. The Fan Performance tables offer motor/drive recommendations. In cases when two motor/drive combinations would work, Carrier recommended the lower horsepower option.
5. For information on the electrical properties of Carrier's motors, please see the Electrical information section of this book.

APPENDIX C — FAN PERFORMANCE (cont)

Table C — 50HCQA04 3 Ton Horizontal Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	900	0.57	0.25
	975	0.47	0.24
	1050	0.37	0.22
	1125	0.27	0.21
	1200	0.18	0.20
	1275	0.09	0.20
	1350	—	—
	1425	—	—
	1500	—	—
2	900	0.73	0.30
	975	0.62	0.29
	1050	0.51	0.28
	1125	0.41	0.27
	1200	0.30	0.25
	1275	0.19	0.24
	1350	0.08	0.22
	1425	—	—
	1500	—	—
3	900	1.04	0.41
	975	0.93	0.40
	1050	0.82	0.39
	1125	0.70	0.38
	1200	0.58	0.36
	1275	0.46	0.35
	1350	0.34	0.33
	1425	0.23	0.31
	1500	0.12	0.30
4	900	1.26	0.49
	975	1.18	0.50
	1050	1.09	0.50
	1125	0.99	0.50
	1200	0.88	0.49
	1275	0.76	0.47
	1350	0.63	0.46
	1425	0.50	0.44
	1500	0.37	0.42
5	900	1.35	0.52
	975	1.30	0.54
	1050	1.26	0.57
	1125	1.21	0.59
	1200	1.16	0.62
	1275	1.12	0.64
	1350	1.07	0.67
	1425	1.02	0.70
	1500	0.97	0.73

Table D — 50HCQA04 3 Ton Vertical Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	900	0.44	0.19
	975	0.34	0.18
	1050	0.24	0.17
	1125	0.15	0.16
	1200	0.07	0.16
	1275	—	—
	1350	—	—
	1425	—	—
	1500	—	—
2	900	0.60	0.24
	975	0.49	0.23
	1050	0.38	0.22
	1125	0.28	0.21
	1200	0.18	0.20
	1275	0.09	0.19
	1350	—	—
	1425	—	—
	1500	—	—
3	900	0.93	0.36
	975	0.81	0.35
	1050	0.70	0.34
	1125	0.58	0.33
	1200	0.47	0.31
	1275	0.36	0.30
	1350	0.25	0.29
	1425	0.14	0.27
	1500	—	—
4	900	1.15	0.44
	975	1.07	0.45
	1050	0.97	0.46
	1125	0.86	0.46
	1200	0.74	0.43
	1275	0.61	0.41
	1350	0.48	0.40
	1425	0.35	0.39
	1500	0.23	0.37
5	900	1.24	0.51
	975	1.19	0.52
	1050	1.24	0.54
	1125	1.24	0.57
	1200	1.03	0.59
	1275	0.98	0.61
	1350	0.93	0.64
	1425	0.88	0.67
	1500	0.82	0.69

Table E — 50HCQA05 4 Ton Horizontal Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	1200	0.93	0.48
	1300	0.80	0.46
	1400	0.66	0.44
	1500	0.51	0.41
	1600	0.36	0.39
	1700	0.22	0.36
	1800	0.08	0.33
	1900	—	—
	2000	—	—
2	1200	1.04	0.53
	1300	0.91	0.51
	1400	0.76	0.48
	1500	0.61	0.46
	1600	0.45	0.43
	1700	0.30	0.40
	1800	0.16	0.38
	1900	0.04	0.35
	2000	—	—
3	1200	1.18	0.58
	1300	1.09	0.59
	1400	0.98	0.60
	1500	0.86	0.60
	1600	0.72	0.57
	1700	0.57	0.54
	1800	0.42	0.51
	1900	0.28	0.48
	2000	0.15	0.45
4	1200	1.24	0.60
	1300	1.18	0.63
	1400	1.12	0.66
	1500	1.04	0.71
	1600	0.95	0.70
	1700	0.85	0.71
	1800	0.73	0.71
	1900	0.60	0.69
	2000	0.45	0.65
5	1200	1.25	0.61
	1300	1.20	0.65
	1400	1.12	0.68
	1500	1.04	0.68
	1600	1.05	0.76
	1700	1.01	0.76
	1800	0.96	0.84
	1900	0.91	0.89
	2000	0.87	0.93

Table F — 50HCQA05 4 Ton Vertical Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	1200	0.87	0.43
	1300	0.73	0.41
	1400	0.59	0.39
	1500	0.43	0.37
	1600	0.27	0.34
	1700	0.12	0.33
	1800	—	—
	1900	—	—
	2000	—	—
2	1200	0.96	0.48
	1300	0.84	0.46
	1400	0.69	0.44
	1500	0.53	0.41
	1600	0.37	0.39
	1700	0.21	0.36
	1800	0.06	0.34
	1900	—	—
	2000	—	—
3	1200	1.13	0.53
	1300	1.06	0.53
	1400	0.98	0.54
	1500	0.88	0.56
	1600	0.76	0.54
	1700	0.62	0.52
	1800	0.47	0.50
	1900	0.31	0.47
	2000	0.15	0.45
4	1200	1.16	0.57
	1300	1.12	0.59
	1400	1.07	0.62
	1500	1.00	0.67
	1600	0.91	0.66
	1700	0.80	0.67
	1800	0.67	0.67
	1900	0.52	0.63
	2000	0.35	0.61
5	1200	1.16	0.59
	1300	1.11	0.63
	1400	1.01	0.67
	1500	0.91	0.67
	1600	0.96	0.75
	1700	0.91	0.75
	1800	0.86	0.83
	1900	0.80	0.87
	2000	0.74	0.91

Table G — 50HCQA06 5 Ton Horizontal Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	1500	1.37	0.74
	1625	1.22	0.73
	1750	0.08	0.70
	1875	—	—
	2000	—	—
	2125	—	—
	2250	—	—
	2375	—	—
	2500	—	—
2	1500	0.54	0.44
	1625	0.37	0.41
	1750	0.20	0.38
	1875	0.04	0.35
	2000	—	—
	2125	—	—
	2250	—	—
	2375	—	—
	2500	—	—
3	1500	1.28	0.83
	1625	1.10	0.81
	1750	0.90	0.78
	1875	0.68	0.74
	2000	0.47	0.70
	2125	0.27	0.66
	2250	0.10	0.62
	2375	—	—
	2500	—	—
4	1500	1.46	0.94
	1625	1.32	0.92
	1750	1.16	0.96
	1875	0.96	0.95
	2000	0.76	0.91
	2125	0.54	0.86
	2250	0.33	0.82
	2375	0.14	0.78
	2500	0.00	0.72
5	1500	1.52	0.97
	1625	1.42	1.01
	1750	1.16	1.05
	1875	0.96	1.09
	2000	1.00	1.09
	2125	0.82	1.06
	2250	0.62	1.02
	2375	0.40	0.98
	2500	0.16	0.93

Table H — 50HCQA06 5 Ton Vertical Unit Direct Drive

Speed (Torque) Tap	CFM	ESP	BHP
1	1500	0.27	0.32
	1625	0.13	0.30
	1750	—	—
	1875	—	—
	2000	—	—
	2125	—	—
	2250	—	—
	2375	—	—
	2500	—	—
2	1500	0.42	0.40
	1625	0.25	0.37
	1750	0.08	0.34
	1875	—	—
	2000	—	—
	2125	—	—
	2250	—	—
	2375	—	—
	2500	—	—
3	1500	1.11	0.79
	1625	0.91	0.76
	1750	0.70	0.74
	1875	0.50	0.70
	2000	0.30	0.67
	2125	0.12	0.63
	2250	—	—
	2375	—	—
	2500	—	—
4	1500	1.29	0.90
	1625	1.13	0.88
	1750	0.95	0.91
	1875	0.74	0.88
	2000	0.52	0.84
	2125	0.30	0.80
	2250	0.11	0.77
	2375	—	—
	2500	—	—
5	1500	1.36	0.94
	1625	1.24	0.99
	1750	0.95	1.02
	1875	0.74	1.05
	2000	0.74	1.03
	2125	0.53	0.99
	2250	0.31	0.94
	2375	0.08	0.90
	2500	0.14	0.86

APPENDIX C — FAN PERFORMANCE (cont)

Table I — 50HCQA04 3 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	574	0.13	707	0.23	817	0.34	913	0.47	999	0.61	1078	0.77	1151	0.93	1220	1.11	1284	1.30	1346	1.49
975	597	0.15	727	0.25	835	0.37	929	0.50	1015	0.64	1093	0.80	1165	0.97	1233	1.15	1297	1.33	1358	1.53
1050	621	0.18	747	0.28	853	0.40	946	0.53	1030	0.68	1108	0.84	1180	1.01	1247	1.19	1311	1.38	1371	1.58
1125	646	0.20	768	0.31	872	0.43	964	0.57	1047	0.72	1123	0.88	1195	1.05	1261	1.23	1325	1.42	1385	1.62
1200	671	0.23	790	0.34	892	0.47	982	0.61	1064	0.76	1140	0.92	1210	1.10	1276	1.28	1339	1.47	1399	1.68
1275	696	0.26	812	0.38	912	0.51	1001	0.65	1082	0.81	1157	0.97	1226	1.15	1292	1.33	1354	1.53	1414	1.73
1350	723	0.30	835	0.42	933	0.55	1020	0.70	1100	0.86	1174	1.02	1243	1.20	1308	1.39	1370	1.59	1429	1.80
1425	749	0.34	859	0.46	955	0.60	1040	0.75	1119	0.91	1192	1.08	1260	1.26	1325	1.45	1386	1.65	1444	1.86
1500	776	0.38	883	0.51	977	0.65	1061	0.80	1138	0.97	1210	1.14	1278	1.33	1342	1.52	1403	1.72	1461	1.93

LEGEND

— Med Static Motor and Drive - 819-1251 RPM, Max BHP 1.5 (motor is new 1.7 HP)
— High Static Motor and Drive - 1035-1466 RPM, Max BHP 2.0 (motor is 2.4 HP)

Table J — 50HCQA04 3 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	594	0.15	740	0.25	867	0.37	981	0.52	1084	0.68	1180	0.86	1269	1.05	1354	1.25	1434	1.47	**1511**	**1.70**
975	618	0.17	758	0.28	881	0.40	991	0.55	1092	0.71	1186	0.89	1275	1.08	1358	1.29	1437	1.51	**1513**	**1.74**
1050	642	0.19	777	0.30	896	0.43	1003	0.58	1102	0.75	1194	0.92	1281	1.12	1363	1.32	1441	1.54	**1516**	**1.78**
1125	668	0.22	797	0.34	912	0.47	1017	0.62	1113	0.79	1204	0.97	1289	1.16	1370	1.37	1447	1.59	**1520**	**1.82**
1200	695	0.25	818	0.37	930	0.51	1032	0.66	1126	0.83	1215	1.01	1298	1.21	1378	1.42	1454	1.64	**1526**	**1.87**
1275	722	0.29	841	0.41	949	0.55	1048	0.71	1140	0.88	1227	1.06	1309	1.26	1387	1.47	1462	1.69	**1533**	**1.92**
1350	750	0.33	864	0.46	968	0.60	1065	0.76	1155	0.93	1240	1.12	1321	1.32	1397	1.53	**1471**	**1.75**	**1541**	**1.99**
1425	778	0.37	888	0.50	989	0.65	1083	0.81	1171	0.99	1254	1.18	1333	1.38	1409	1.59	**1481**	**1.82**	—	—
1500	807	0.42	913	0.56	1011	0.71	1103	0.87	1188	1.05	1270	1.24	1347	1.45	1421	1.66	**1492**	**1.89**	—	—

LEGEND

— Med Static Motor and Drive - 819-1251 RPM, Max BHP 1.5 (motor is new 1.7 HP)
— High Static Motor and Drive - 1035-1466 RPM, Max BHP 2.0 (motor is 2.4 HP)
BOLD — Field-supplied drive recommended using field supplied fan pulley (part no. KR11AZ606) motor pulley (part no. KR11HY191), and belt (KR29AF043)

APPENDIX C — FAN PERFORMANCE (cont)

Table K — 50HCQA05 4 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1200	630	0.20	755	0.31	859	0.43	949	0.56	1030	0.70	1104	0.84	1173	0.99	1237	1.15	1298	1.32	1356	1.49
1300	659	0.24	781	0.36	883	0.48	972	0.61	1052	0.76	1125	0.91	1194	1.06	1258	1.23	1318	1.40	1375	1.58
1400	689	0.28	808	0.40	908	0.53	995	0.67	1075	0.82	1147	0.98	1215	1.14	1278	1.31	1338	1.48	1395	1.67
1500	720	0.33	836	0.46	933	0.59	1020	0.74	1098	0.89	1170	1.05	1237	1.22	1299	1.39	1359	1.57	1416	1.76
1600	752	0.38	864	0.52	960	0.66	1044	0.81	1121	0.97	1193	1.13	1259	1.31	1321	1.49	1380	1.67	1437	1.86
1700	784	0.44	893	0.58	986	0.73	1070	0.89	1146	1.05	1216	1.22	1282	1.40	1344	1.59	1402	1.78	1458	1.97
1800	816	0.50	922	0.65	1014	0.81	1096	0.97	1171	1.14	1240	1.32	1305	1.50	1366	1.69	1424	1.89	*1480*	*2.09*
1900	849	0.58	952	0.73	1042	0.90	1122	1.07	1196	1.24	1265	1.43	1329	1.61	1390	1.81	*1447*	*2.01*	*1502*	*2.22*
2000	882	0.66	982	0.82	1070	0.99	1149	1.17	1222	1.35	1290	1.54	1353	1.73	1413	1.93	*1470*	*2.14*	*1525*	*2.35*

LEGEND

— Med Static Motor and Drive - 920-1303 RPM, Max BHP 1.5 (motor is new 1.7 HP)
— High Static Motor and Drive - 1035-1466 RPM, Max BHP 2.0 (motor is 2.4 HP)
Italics — Field-supplied motor and drive required recommend using field supplied motor (HD58FE651-230v and 460v, HD58FE576-575 volt), fan pulley (part no. KR11AZ606), motor pulley (part no. KR11HY213), and belt (KR29AF043)

Table L — 50HCQA05 4 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
900	682	0.25	800	0.36	897	0.48	982	0.61	1058	0.75	1128	0.89	1192	1.03	1252	1.18	1309	1.34	1363	1.50
975	717	0.29	832	0.42	928	0.55	1011	0.68	1086	0.82	1155	0.97	1219	1.12	1279	1.28	1336	1.44	1389	1.61
1050	753	0.34	865	0.48	958	0.61	1041	0.76	1115	0.91	1183	1.06	1247	1.22	1306	1.38	1362	1.55	1416	1.72
1125	789	0.40	898	0.54	990	0.69	1071	0.84	1144	1.00	1212	1.16	1275	1.32	1334	1.49	1389	1.67	1443	1.85
1200	826	0.47	932	0.62	1022	0.77	1102	0.93	1174	1.09	1241	1.26	1303	1.43	1362	1.61	1417	1.79	1470	1.98
1275	863	0.54	966	0.70	1055	0.86	1133	1.03	1205	1.20	1271	1.37	1332	1.55	1390	1.74	1445	1.93	*1498*	*2.12*
1350	901	0.62	1001	0.79	1088	0.96	1165	1.13	1235	1.31	1301	1.50	1362	1.68	1419	1.87	*1474*	*2.07*	*1526*	*2.27*
1425	939	0.71	1037	0.89	1121	1.07	1197	1.25	1267	1.44	1331	1.63	1392	1.82	*1449*	*2.02*	*1503*	*2.22*	—	—
1500	978	0.81	1073	0.99	1156	1.18	1230	1.37	1299	1.57	1362	1.77	1422	1.97	*1478*	*2.18*	*1532*	*2.38*	—	—

LEGEND

— Med Static Motor and Drive - 920-1303 RPM, Max BHP 1.5 (motor is new 1.7 HP)
— High Static Motor and Drive - 1035-1466 RPM, Max BHP 2.0 (motor is 2.4 HP)
Italics — Field-supplied motor and drive required recommend using field supplied motor (HD58FE651-230v and 460v, HD58FE576-575 volt), fan pulley (part no. KR11AZ606), motor pulley (part no. KR11HY213), and belt (KR29AF043)

APPENDIX C — FAN PERFORMANCE (cont)

Table M — 50HCQA06 5 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1500	725	0.33	840	0.46	937	0.60	1023	0.75	1101	0.90	1172	1.06	1239	1.23	1302	1.40	1361	1.58	1418	1.77
1625	765	0.40	876	0.54	970	0.68	1054	0.84	1131	1.00	1201	1.16	1267	1.34	1329	1.52	1388	1.71	1444	1.90
1750	806	0.48	912	0.63	1004	0.78	1087	0.94	1162	1.11	1231	1.28	1296	1.46	1358	1.65	1416	1.84	1472	2.04
1875	847	0.57	950	0.72	1039	0.88	1120	1.05	1194	1.23	1262	1.41	1326	1.60	1387	1.79	1445	1.99	1499	2.20
2000	889	0.66	988	0.83	1075	1.00	1154	1.18	1226	1.36	1294	1.55	1357	1.74	1417	1.95	1474	2.15	1528	2.36
2125	931	0.78	1027	0.95	1112	1.13	1189	1.31	1260	1.50	1326	1.70	1388	1.90	1447	2.11	1504	2.33	—	—
2250	974	0.90	1067	1.08	1149	1.27	1224	1.46	1294	1.66	1359	1.87	1420	2.08	1479	2.29	1534	2.51	—	—
2375	1018	1.03	1107	1.23	1187	1.43	1261	1.63	1329	1.84	1393	2.05	1453	2.27	1511	2.49	—	—	—	—
2500	1061	1.19	1148	1.39	1226	1.59	1297	1.81	1364	2.02	1427	2.24	1487	2.47	1543	2.70	—	—	—	—

LEGEND

— Med Static - 1066-1380 RPM, Max BHP 2.0 (motor is new 2.4 HP)
— High Static - 1208-1550 RPM, Max BHP 2.9 (motor is 2.9 HP)

Table N — 50HCQA06 5 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1500	794	0.41	902	0.55	993	0.69	1074	0.85	1147	1.00	1214	1.16	1277	1.33	1336	1.50	1392	1.67	1445	1.85
1625	840	0.49	945	0.64	1034	0.80	1113	0.96	1185	1.13	1251	1.30	1313	1.47	1371	1.65	1427	1.83	1479	2.02
1750	888	0.59	988	0.75	1075	0.92	1153	1.09	1223	1.26	1289	1.44	1350	1.63	1407	1.81	1462	2.01	1514	2.20
1875	936	0.70	1033	0.87	1117	1.05	1193	1.23	1263	1.41	1327	1.60	1387	1.80	1444	1.99	1498	2.19	1550	2.40
2000	984	0.82	1078	1.00	1160	1.19	1235	1.39	1303	1.58	1366	1.78	1426	1.98	1482	2.19	1535	2.40	—	—
2125	1033	0.96	1124	1.15	1204	1.35	1277	1.56	1343	1.76	1406	1.97	1464	2.18	1520	2.40	—	—	—	—
2250	1083	1.11	1170	1.32	1248	1.53	1319	1.74	1385	1.96	1446	2.18	1504	2.40	—	—	—	—	—	—
2375	1133	1.28	1217	1.50	1293	1.72	1363	1.95	1427	2.17	1487	2.40	1544	2.63	—	—	—	—	—	—
2500	1183	1.47	1265	1.70	1339	1.93	1406	2.17	1470	2.41	1529	2.64	—	—	—	—	—	—	—	—

LEGEND

— Med Static - 1066-1380 RPM, Max BHP 2.0 (motor is new 2.4 HP)
— High Static - 1208-1550 RPM, Max BHP 2.9 (motor is 2.9 HP)

APPENDIX C — FAN PERFORMANCE (cont)

Table O — 50HCQA/D07 6 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	415	0.28	510	0.46	588	0.65	655	0.85	715	1.08	770	1.31	821	1.56	868	1.82	913	2.09	955	2.36
1950	431	0.32	525	0.51	601	0.71	668	0.93	727	1.16	782	1.40	832	1.66	879	1.92	924	2.20	966	2.49
2100	448	0.38	540	0.57	615	0.78	681	1.01	740	1.25	794	1.50	844	1.76	891	2.03	935	2.32	977	2.61
2250	465	0.43	555	0.64	629	0.86	694	1.10	753	1.34	806	1.60	856	1.87	903	2.15	947	2.45	988	2.75
2400	483	0.49	571	0.71	644	0.94	708	1.19	766	1.45	819	1.71	868	1.99	915	2.28	958	2.58	1000	2.89
2550	501	0.56	587	0.79	659	1.04	722	1.29	779	1.56	832	1.83	881	2.12	927	2.42	971	2.73	1012	3.05
2700	519	0.64	603	0.88	674	1.14	737	1.40	793	1.68	845	1.96	894	2.26	940	2.57	983	2.88	1024	3.21
2850	538	0.72	620	0.98	689	1.24	751	1.52	807	1.80	859	2.10	907	2.41	953	2.72	995	3.05	1036	3.38
3000	557	0.82	637	1.08	705	1.36	766	1.64	822	1.94	873	2.24	921	2.56	966	2.89	1008	3.22	1049	3.56

LEGEND

— Std Static - 489-747 RPM, Max BHP 1.2 (motor is 1.7 HP)
— Med Static - 733-949 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High Static - 909-1102 RPM, Max BHP 4.0 (motor is 4.9 HP)

Table P — 50HCQA/D07 6 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1800	446	0.33	534	0.50	609	0.70	676	0.91	736	1.14	791	1.39	843	1.65	892	1.93	938	2.22	981	2.53
1950	467	0.39	552	0.57	625	0.77	690	0.99	750	1.23	804	1.49	855	1.76	903	2.04	949	2.34	992	2.65
2100	489	0.45	571	0.64	642	0.86	706	1.08	764	1.33	818	1.59	868	1.87	915	2.16	961	2.46	1003	2.78
2250	511	0.53	591	0.73	660	0.95	722	1.19	779	1.44	832	1.71	882	1.99	928	2.29	973	2.59	1015	2.92
2400	534	0.61	611	0.82	678	1.05	739	1.30	795	1.56	847	1.83	896	2.12	942	2.43	986	2.74	1028	3.07
2550	558	0.71	631	0.93	697	1.17	756	1.42	811	1.69	862	1.97	910	2.27	956	2.58	999	2.90	1041	3.23
2700	581	0.81	652	1.04	716	1.29	774	1.55	828	1.83	878	2.12	926	2.42	971	2.74	1013	3.07	1055	3.41
2850	605	0.93	674	1.17	736	1.43	792	1.70	845	1.98	895	2.28	941	2.59	986	2.92	1028	3.25	1069	3.60
3000	630	1.06	696	1.31	756	1.58	811	1.86	863	2.15	912	2.46	958	2.78	1001	3.11	1043	3.45	1083	3.80

LEGEND

— Std Static - 489-747 RPM, Max BHP 1.2 (motor is 1.7 HP)
— Med Static - 733-949 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High Static - 909-1102 RPM, Max BHP 4.0 (motor is 4.9 HP)

APPENDIX C — FAN PERFORMANCE (cont)

Table Q — 50HCQD08 7.5 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	433	0.29	518	0.41	596	0.54	667	0.67	733	0.81	795	0.96	854	1.11	910	1.27	963	1.43	1014	1.60
2438	454	0.35	535	0.48	609	0.61	677	0.75	741	0.90	802	1.05	859	1.21	913	1.38	966	1.55	1016	1.72
2625	477	0.42	553	0.55	624	0.69	689	0.84	751	1.00	810	1.16	865	1.32	919	1.49	970	1.67	1019	1.85
2813	500	0.49	572	0.64	640	0.78	703	0.94	763	1.10	819	1.27	874	1.44	925	1.62	975	1.80	1023	1.99
3000	523	0.58	592	0.73	657	0.88	718	1.05	775	1.22	830	1.39	883	1.57	934	1.76	982	1.95	1029	2.14
3188	547	0.68	613	0.83	675	1.00	733	1.17	789	1.34	843	1.53	894	1.71	943	1.90	990	2.10	1036	2.30
3375	571	0.78	634	0.95	694	1.12	750	1.30	804	1.48	856	1.67	905	1.86	953	2.06	1000	2.27	1045	2.48
3563	596	0.90	656	1.07	713	1.25	768	1.44	820	1.63	870	1.83	918	2.03	965	2.23	1010	2.44	1054	2.66
3750	621	1.03	679	1.21	734	1.40	786	1.59	837	1.79	885	1.99	932	2.20	978	2.42	1022	2.64	1065	2.86

LEGEND

— Std Static - 518-733 RPM, Max BHP 1.2 (motor is 1.7 HP)
— Med Static - 690-936 RPM, Max BHP 1.7 (motor is 2.4 HP)
— High Static - 838-1084 RPM, Max BHP 2.8 (motor is 3.7 HP)

Table R — 50HCQD08 7.5 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2250	457	0.32	536	0.44	604	0.55	664	0.67	719	0.79	770	0.91	817	1.03	861	1.15	903	1.28	943	1.40
2438	481	0.39	557	0.51	623	0.64	682	0.77	735	0.89	785	1.02	832	1.15	876	1.28	917	1.41	957	1.55
2625	505	0.47	578	0.60	642	0.73	700	0.87	753	1.00	802	1.14	847	1.28	891	1.42	932	1.56	971	1.70
2813	530	0.55	601	0.70	663	0.84	719	0.98	771	1.13	819	1.27	864	1.42	907	1.57	947	1.72	986	1.87
3000	556	0.65	623	0.80	684	0.95	738	1.11	789	1.26	836	1.42	881	1.57	923	1.73	963	1.89	1001	2.05
3188	582	0.76	647	0.92	705	1.08	759	1.25	808	1.41	855	1.57	898	1.74	940	1.90	979	2.07	1017	2.24
3375	608	0.88	671	1.05	727	1.22	779	1.40	828	1.57	873	1.74	916	1.91	957	2.09	996	2.26	1034	2.44
3563	634	1.01	695	1.19	750	1.38	801	1.56	848	1.74	893	1.92	935	2.11	975	2.29	1014	2.47	1051	2.66
3750	661	1.16	719	1.35	773	1.54	822	1.73	869	1.93	912	2.12	954	2.31	994	2.50	1031	2.70	1068	2.89

LEGEND

— Std Static - 518-733 RPM, Max BHP 1.2 (motor is 1.7 HP)
— Med Static - 690-936 RPM, Max BHP 1.7 (motor is 2.4 HP)
— High Static - 838-1084 RPM, Max BHP 2.8 (motor is 3.7 HP)

APPENDIX C — FAN PERFORMANCE (cont)

Table S — 50HCQD09 8.5 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	468	0.39	546	0.52	618	0.66	684	0.80	747	0.96	806	1.11	863	1.28	916	1.45	968	1.62	1018	1.80
2763	493	0.47	567	0.61	635	0.76	699	0.91	760	1.07	817	1.24	871	1.41	924	1.59	974	1.77	1022	1.95
2975	520	0.57	589	0.72	654	0.87	716	1.03	774	1.20	829	1.37	882	1.55	932	1.74	981	1.93	1028	2.12
3188	547	0.68	613	0.83	675	1.00	733	1.17	789	1.34	843	1.53	894	1.71	943	1.90	990	2.10	1036	2.30
3400	575	0.80	637	0.96	696	1.14	752	1.31	806	1.50	858	1.69	907	1.88	955	2.09	1001	2.29	1046	2.50
3613	603	0.94	662	1.11	719	1.29	773	1.48	824	1.67	874	1.87	922	2.07	968	2.28	1013	2.49	1057	2.71
3825	631	1.09	688	1.27	742	1.46	794	1.66	843	1.86	891	2.07	938	2.28	983	2.49	1027	2.71	—	—
4038	660	1.26	714	1.45	766	1.65	816	1.85	864	2.06	910	2.28	955	2.50	999	2.72	—	—	—	—
4250	689	1.45	741	1.65	790	1.86	838	2.07	885	2.29	930	2.51	973	2.74	—	—	—	—	—	—

LEGEND

— Std static - 440-609 RPM, Max BHP 1.7 (motor is 2.4 HP)
— Med static - 591-838 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High static - 838-1084 RPM, Max BHP 2.8 (motor is 3.7 HP)

Table T — 50HCQD09 8.5 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
2550	495	0.43	570	0.56	634	0.70	693	0.83	746	0.96	795	1.09	841	1.23	885	1.36	926	1.50	965	1.64
2763	524	0.53	595	0.67	657	0.81	714	0.95	766	1.09	814	1.24	859	1.38	902	1.53	943	1.68	982	1.82
2975	552	0.63	620	0.79	681	0.94	736	1.09	787	1.24	834	1.40	878	1.55	921	1.71	961	1.86	999	2.02
3188	582	0.76	647	0.92	705	1.08	759	1.25	808	1.41	855	1.57	898	1.74	940	1.90	979	2.07	1017	2.24
3400	611	0.89	674	1.07	730	1.24	782	1.42	831	1.59	876	1.76	919	1.94	960	2.12	998	2.29	1036	2.47
3613	641	1.05	701	1.23	756	1.42	806	1.60	854	1.79	898	1.97	940	2.16	980	2.34	1018	2.53	1055	2.72
3825	672	1.22	729	1.42	782	1.61	831	1.81	877	2.00	921	2.20	962	2.40	1001	2.59	1039	2.79	—	—
4038	702	1.41	758	1.62	809	1.83	857	2.03	901	2.24	944	2.45	984	2.65	—	—	—	—	—	—
4250	733	1.62	787	1.84	836	2.06	883	2.28	926	2.49	968	2.71	1007	2.93	—	—	—	—	—	—

LEGEND

— Std static - 440-609 RPM, Max BHP 1.7 (motor is 2.4 HP)
— Med static - 591-838 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High static - 838-1084 RPM, Max BHP 2.8 (motor is 3.7 HP)

APPENDIX C — FAN PERFORMANCE (cont)

Table U — 50HCQD12 10 Ton Horizontal Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	335	0.32	**421**	**0.51**	500	0.74	572	1.00	637	1.29	697	1.59	751	1.91	801	2.24	847	2.59	891	2.94
3250	**350**	**0.38**	**430**	**0.58**	505	0.81	575	1.08	640	1.37	699	1.68	753	2.01	803	2.35	850	2.71	895	3.08
3500	**365**	**0.45**	441	0.65	512	0.89	579	1.16	642	1.46	701	1.78	755	2.12	806	2.47	853	2.84	898	3.22
3750	**381**	**0.53**	452	0.74	520	0.98	584	1.26	645	1.56	703	1.88	757	2.23	808	2.59	855	2.97	900	3.36
4000	**397**	**0.61**	464	0.83	529	1.08	590	1.36	650	1.67	706	2.00	*759*	*2.35*	809	2.72	857	3.11	902	3.51
4250	**413**	**0.70**	477	0.93	538	1.19	598	1.47	655	1.78	709	2.12	*761*	*2.48*	811	2.86	858	3.25	903	3.66
4500	**429**	**0.81**	491	1.05	549	1.31	606	1.60	661	1.91	714	2.25	765	2.62	813	3.00	860	3.40	905	3.82
4750	445	0.92	505	1.17	561	1.44	615	1.73	667	2.05	719	2.40	768	2.77	816	3.15	862	3.56	906	3.99
5000	462	1.04	519	1.30	573	1.58	625	1.88	675	2.21	725	2.55	773	2.93	820	3.32	865	3.73	908	4.16

LEGEND

— Std Static - 440-609 RPM, Max BHP 1.9 (motor is 2.4 HP)
— Med Static - 547-757 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High Static - 762-963 RPM, Max BHP 6.5* (motor is 5.0 HP)
BOLD — Field-supplied drive (motor pulley = KR11HY151, use belt and blower pulley from standard static), rpm range = 338-507
Italics — Field-supplied drive (motor pulley = KR11HY186, blower pulley = KR51BJ413, belt = KR30BE072, use medium static motor), rpm range = 684-864

* On Size 12 units, Max BHP for the High-Static High-Efficiency motor varies with the motor's voltage; see the table below.

Voltage	BHP
208	6.5
230	6.9
460	7.0
575	8.3

Table V — 50HCQD12 10 Ton Vertical Supply

CFM	Available External Static Pressure (in. wg)																			
	0.2		0.4		0.6		0.8		1.0		1.2		1.4		1.6		1.8		2.0	
	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
3000	**383**	**0.39**	470	0.60	549	0.85	620	1.13	684	1.42	742	1.73	795	2.05	845	2.38	891	2.73	935	3.08
3250	**402**	**0.47**	483	0.68	559	0.94	629	1.22	692	1.53	749	1.85	802	2.19	852	2.54	899	2.89	943	3.26
3500	**421**	**0.55**	498	0.78	570	1.04	637	1.33	699	1.65	756	1.98	809	2.33	859	2.69	906	3.06	950	3.45
3750	441	0.65	513	0.88	582	1.15	647	1.45	707	1.78	764	2.12	816	2.48	866	2.86	912	3.24	956	3.64
4000	461	0.75	529	0.99	594	1.27	657	1.58	716	1.91	771	2.27	824	2.64	873	3.03	919	3.42	963	3.83
4250	481	0.87	545	1.12	608	1.41	668	1.72	725	2.06	780	2.43	831	2.81	880	3.21	926	3.62	970	4.04
4500	502	1.01	563	1.26	622	1.55	680	1.88	735	2.22	788	2.60	839	2.99	887	3.40	933	3.82	976	4.25
4750	522	1.15	581	1.42	637	1.72	693	2.05	746	2.40	798	2.78	847	3.18	895	3.60	940	4.03	983	4.47
5000	543	1.31	599	1.59	653	1.90	706	2.23	*758*	*2.59*	808	2.98	856	3.38	903	3.81	947	4.25	990	4.71

LEGEND

— Std Static - 440-609 RPM, Max BHP 1.9 (motor is 2.4 HP)
— Med Static - 547-757 RPM, Max BHP 2.9 (motor is 2.9 HP)
— High Static - 762-963 RPM, Max BHP 6.5* (motor is 5.0 HP)
BOLD — Field-supplied drive (motor pulley = KR11HY151, use belt and blower pulley from standard static), rpm range = 338-507
Italics — Field-supplied drive (motor pulley = KR11HY186, blower pulley = KR51BJ413, belt = KR30BE072, use medium static motor), rpm range = 684-864
Underline — Field-supplied (motor pulley = KR11HY194, blower pulley = KR51BJ413, belt = KR30BE072, use high static motor), rpm range = 846-1061

* On Size 12 units, Max BHP for the High-Static High-Efficiency motor varies with the motor's voltage; see the table below.

Voltage	BHP
208	6.5
230	6.9
460	7.0
575	8.3

APPENDIX C — FAN PERFORMANCE (cont)

Table W — Pulley Adjustment - Belt Drive

UNIT		MOTOR/DRIVE COMBO	MOTOR PULLEY TURNS OPEN										
			0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
04	3 phase	Medium Static	1251	1208	1165	1121	1078	1035	992	949	905	862	819
		High Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
05	3 phase	Medium Static	1303	1265	1226	1188	1150	1112	1073	1035	997	958	920
		High Static	1466	1423	1380	1337	1294	1251	1207	1164	1121	1078	1035
06	3 phase	Medium Static	1380	1349	1317	1286	1254	1223	1192	1160	1129	1097	1066
		High Static	1639	1596	1553	1510	1467	1424	1380	1337	1294	1251	1208
07	3 phase	Standard Static	747	721	695	670	644	618	592	566	541	515	489
		Medium Static	949	927	906	884	863	841	819	798	776	755	733
		High Static	1102	1083	1063	1044	1025	1006	986	967	948	928	909
08	3 phase	Standard Static	733	712	690	669	647	626	604	583	561	540	518
		Medium Static	936	911	887	862	838	813	788	764	739	715	690
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838
09	3 phase	Standard Static	652	633	614	594	575	556	537	518	498	479	460
		Medium Static	838	813	789	764	739	715	690	665	640	616	591
		High Static	1084	1059	1035	1010	986	961	936	912	887	863	838
12	3 phase	Standard Static	609	592	575	558	541	525	508	491	474	457	440
		Medium Static	757	736	715	694	673	652	631	610	589	568	547
		High Static	963	943	923	903	883	863	842	822	802	782	762

NOTE: Do not adjust pulley further than 5 turns open.

— **Factory settings**

APPENDIX D — ELECTRICAL INFORMATION

Table X — 50HCQA04 Single Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	16.6	79	190	1.0	DD-STD	78%	7.4
230-1-60	187	253	16.6	79	190	1.0	DD-STD	78%	7.4
208-3-60	187	253	10.4	73	190	1.0	DD-STD MED HIGH	78% 87% 87%	7.4 5.2 6.9
230-3-60	187	253	10.4	73	190	1.0	DD-STD MED HIGH	78% 87% 87%	7.4 4.9 6.7
460-3-60	414	506	5.8	38	190	0.5	DD-STD MED HIGH	78% 87% 87%	4.0 2.5 3.4
575-3-60	518	633	3.8	37	190	0.5	DD-STD MED HIGH	78% 72% 78%	4.0 1.6 2.0

Table Y — 50HCQA05 Single Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	19.8	109	325	1.4	DD-STD	78%	7.4
230-1-60	187	253	19.8	109	325	1.4	DD-STD	78%	7.4
208-3-60	187	253	13.1	83	325	1.4	DD-STD MED HIGH	78% 87% 69%	7.4 5.2 5.2
230-3-60	187	253	13.1	83	325	1.4	DD-STD MED HIGH	78% 87% 69%	7.4 4.9 5.2
460-3-60	414	506	6.1	41	325	0.8	DD-STD MED HIGH	78% 87% 69%	4.0 2.5 2.6
575-3-60	518	633	4.4	33	325	0.8	DD-STD MED HIGH	78% 72% 78%	4.0 1.6 2.0

Table Z — 50HCQA06 Single Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-1-60	187	253	25.0	134	325	1.4	DD-STD	78%	7.4
230-1-60	187	253	25.0	134	325	1.4	DD-STD	78%	7.4
208-3-60	187	253	15.9	110	325	1.4	DD-STD MED HIGH	78% 69% 89%	7.4 5.2 8.4
230-3-60	187	253	15.9	110	325	1.4	DD-STD MED HIGH	78% 69% 89%	7.4 5.2 8.3
460-3-60	414	506	7.0	52	325	0.8	DD-STD MED HIGH	78% 69% 89%	4.0 2.6 4.2
575-3-60	518	633	5.1	40	325	0.8	DD-STD MED HIGH	78% 78% 77%	4.0 2.0 2.8

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AA — 50HCQA07 Single Stage Cooling with Single Speed Indoor Fan Motor (Units Produced On or After 02/16/2015)

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
230-3-60	187	253	19.6	136	325	1.5	STD MED HIGH	87% 89% 83%	5.2 8.4 13.6
230-3-60	187	253	19.6	136	325	1.5	STD MED HIGH	87% 89% 83%	4.9 8.3 12.7
460-3-60	414	506	8.2	66	325	0.8	STD MED HIGH	87% 89% 83%	2.5 4.2 6.4
575-3-60	518	633	6.6	55	325	0.6	STD MED HIGH	72% 77% 81%	1.6 2.8 5.6

(Units Produced on or Prior to 02/15/2015)

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
230-3-60	187	253	19.0	123	325	1.5	STD MED HIGH	87% 89% 83%	5.2 8.4 13.6
230-3-60	187	253	19.0	123	325	1.5	STD MED HIGH	87% 89% 83%	4.9 8.3 12.7
460-3-60	414	506	9.7	62	325	0.8	STD MED HIGH	87% 89% 83%	2.5 4.2 6.4
575-3-60	518	633	7.4	50	325	0.6	STD MED HIGH	72% 77% 81%	1.6 2.8 5.6

Table AB — 50HCQD07 2-Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	18.9	136	325	1.5	STD MED HIGH	75% 79% 83%	5.2 7.5 13.6
230-3-60	187	253	18.9	136	325	1.5	STD MED HIGH	75% 79% 83%	5.2 7.5 12.7
460-3-60	414	506	9.7	66	325	0.8	STD MED HIGH	75% 79% 83%	2.6 3.4 6.4
575-3-60	518	633	7.7	55	325	0.6	STD MED HIGH	72% 77% 81%	1.6 2.8 5.6

Table AC — 50HCQD07 2-Stage Cooling with 2-speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (ea)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	18.9	136	325	1.5	STD MED HIGH	84% 85% 84%	5.8 8.6 13.6
230-3-60	187	253	18.9	136	325	1.5	STD MED HIGH	84% 85% 84%	5.6 7.8 12.7
460-3-60	414	506	9.7	66	325	0.8	STD MED HIGH	79% 85% 84%	2.9 3.8 6.4
575-3-60	518	633	7.7	55	325	0.6	STD MED HIGH	81% 84% 83%	2.8 4.5 6.2

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AD — 50HCQD08 2-Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.1	83	13.1	83	325	1.5	STD MED HIGH	87% 87% 87%	5.2 6.9 10.6
230-3-60	187	253	13.1	83	13.1	83	325	1.5	STD MED HIGH	87% 87% 87%	4.9 6.7 10.6
460-3-60	414	506	6.1	41	6.1	41	325	0.8	STD MED HIGH	87% 87% 87%	2.5 3.4 5.3
575-3-60	518	633	4.4	33	4.4	33	325	0.6	STD MED HIGH	72% 78% 77%	1.6 2.0 2.8

Table AE — 50HCQD08 2-Stage Cooling with 2-Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	13.1	83	13.1	83	325 325 325	1.5 1.5 1.5	STD MED HIGH	84% 77% 82%	5.8 7.1 10.8
230-3-60	187	253	13.1	83	13.1	83	325 325 325	1.5 1.5 1.5	STD MED HIGH	84% 77% 82%	5.6 6.8 9.8
460-3-60	414	506	6.1	41	6.1	41	325 325 325	0.8 0.8 0.8	STD MED HIGH	79% 77% 82%	2.9 3.8 4.9
575-3-60	518	633	4.4	33	4.4	33	325 325 325	0.6 0.6 0.6	STD MED HIGH	81% 80% 84%	2.8 3.5 4.5

Table AF — 50HCQD09 2-Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	16.0	91	13.7	83	325	6.2	STD MED HIGH	80% 80% 81%	6.9 8.4 10.6
230-3-60	187	253	16.0	91	13.7	83	325	6.2	STD MED HIGH	80% 80% 81%	6.7 8.3 10.6
460-3-60	414	506	7.0	46	6.2	41	325	3.1	STD MED HIGH	80% 80% 81%	3.4 4.2 5.3
575-3-60	518	633	5.6	37	4.8	33	325	2.5	STD MED HIGH	80% 80% 81%	2.0 2.8 2.8

Table AG — 50HCQD09 2-Stage Cooling with 2-Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	16.0	91	13.7	83	1070 1070 1070	6.2 6.2 6.2	STD MED HIGH	84% 85% 82%	7.1 8.6 10.8
230-3-60	187	253	16.0	91	13.7	83	1070 1070 1070	6.2 6.2 6.2	STD MED HIGH	84% 85% 82%	6.8 7.8 9.8
460-3-60	414	506	7.0	46	6.2	41	1070 1070 1070	3.1 3.1 3.1	STD MED HIGH	79% 85% 82%	3.8 3.8 4.9
575-3-60	518	633	5.6	37	4.8	33	1070 1070 1070	2.5 2.5 2.5	STD MED HIGH	80% 84% 84%	3.5 4.5 4.5

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AH — 50HCQD12 2-Stage Cooling with Single Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP (Cir 1)		COMP (Cir 2)		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	280	1.5	STD MED HIGH	80% 80% 89.5%	6.8 8.4 17.0
230-3-60	187	253	15.6	110	15.9	110	280	1.5	STD MED HIGH	80% 80% 89.5%	6.7 8.3 15.0
460-3-60	414	506	7.7	52	7.7	52	280	0.8	STD MED HIGH	80% 80% 89.5%	3.4 4.2 7.6
575-3-60	518	633	5.8	39	5.7	39	280	0.7	STD MED HIGH	80% 80% 89.5%	2.0 2.8 6.1

Table AI — 50HCQD12 2-Stage Cooling with 2-Speed Indoor Fan Motor

V-Ph-Hz	VOLTAGE RANGE		COMP 1		COMP 2		OFM (ea)		IFM		
	MIN	MAX	RLA	LRA	RLA	LRA	WATTS	FLA	TYPE	EFF at Full Load	FLA
208-3-60	187	253	15.6	110	15.9	110	280 280 280	1.5 1.5 1.5	STD MED HIGH	77% 85% 90%	7.1 8.6 20.4
230-3-60	187	253	15.6	110	15.9	110	280 280 280	1.5 1.5 1.5	STD MED HIGH	77% 85% 90%	6.8 7.8 20.4
460-3-60	414	506	7.7	52	7.7	52	280 280 280	0.8 0.8 0.8	STD MED HIGH	77% 85% 90%	3.8 3.8 10.2
575-3-60	518	633	5.8	39	5.7	39	280 280 280	0.7 0.7 0.7	STD MED HIGH	80% 84% 94%	3.5 4.5 9.0

Legend and Notes

Applicable for Electrical Data Tables AJ-AU

LEGEND

BRKR	— Circuit breaker
C.O.	— Convenience outlet
DISC	— Disconnect
EFF	— Efficiency
FLA	— Full load amps
LRA	— Locked rotor amps
MCA	— Minimum circuit amps
P.E.	— Power exhaust
Pwrd fr/unit	— Powered from unit
PWRD C.O.	— Powered convenience outlet
UNPWR C.O.	— Unpowered convenience outlet

NOTES:
1. In compliance with NEC requirements for multi-motor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. For 208/230 v units, where one value is shown it is the same for either 208 or 230 volts.
3. Unbalanced 3-Phase Supply Voltage
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percentage of voltage imbalance.

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 230-3-60

AB = 224 v
BC = 231 v
AC = 226 v

$$\text{Average Voltage} = \frac{(224 + 231 + 226)}{3} = \frac{681}{3} = 227$$

Determine maximum deviation from average voltage.
(AB) 227-224 = 3 v
(BC) 231-227 = 4 v
(AC) 227-226 = 1 v
Maximum deviation is 4 v.
Determine percent of voltage imbalance.

$$\%\ \text{Voltage Imbalance} = 100 \times \frac{4}{227} = 1.78\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

NOTE: Check all factory and field electrical connections for tightness.

Table AJ — 50HCQA04 Unit Wire/Fuse or HACR Breaker Sizing Data
Single Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	30	45	29	88	32	45	31	90
		101A	3.3/4.4	15.9/18.3	49/52	60/60	47/50	104/106	51/54	60/60	49/52	106/108
		102A	4.9/6.5	23.5/27.1	59/63	60/70	56/60	112/115	61/65	70/70	58/62	114/117
		103B	6.5/8.7	31.4/36.3	69/75	70/80	65/70	119/124	71/77	80/80	67/73	121/126
		104B	7.9/10.5	37.9/43.8	77/84	80/90	72/79	126/132	79/86	80/90	75/81	128/134
		102A+102A	9.8/13.0	46.9/54.2	88/97	90/100	83/91	182/196	90/99	90/100	85/93	184/198
208/230-3-60	DD-STD	NONE	—	—	22	30	22	82	24	30	24	84
		101A	3.3/4.4	9.2/10.6	33/35	40/40	32/34	91/93	35/37	40/40	34/36	93/95
		102A	4.9/6.5	13.6/15.6	39/41	45/45	37/40	96/98	41/43	45/45	39/42	98/100
		103B	6.5/8.7	18.1/20.9	44/48	45/50	42/46	100/103	46/50	50/50	45/48	102/105
		104B	7.9/10.5	21.9/25.3	49/53	50/60	47/51	104/107	51/55	60/60	49/53	106/109
		105A	12.0/16.0	33.4/38.5	64/70	70/70	60/66	115/121	66/72	70/80	62/68	117/123
	MED	NONE	—	—	20/19	25/25	19/19	111	22/21	30/30	21/21	113
		101A	3.3/4.4	9.2/10.6	31/33	35/35	30/31	120/122	33/35	40/40	32/33	122/124
		102A	4.9/6.5	13.6/15.6	37/39	40/40	35/37	125/127	39/41	45/45	37/39	127/129
		103B	6.5/8.7	18.1/20.9	42/45	45/50	40/43	129/132	44/47	45/50	42/45	131/134
		104B	7.9/10.5	21.9/25.3	47/51	50/60	44/48	133/136	49/53	50/60	46/50	135/138
		105A	12.0/16.0	33.4/38.5	61/67	70/70	58/63	144/150	63/69	70/70	60/65	146/152
	HIGH	NONE	—	—	23/23	30/30	23/23	147	25/25	30/30	25/25	149
		101A	3.3/4.4	9.2/10.6	34/36	40/40	33/35	156/158	36/38	40/45	36/37	158/160
		102A	4.9/6.5	13.6/15.6	40/42	45/45	38/41	161/163	42/44	45/50	41/43	163/165
		103B	6.5/8.7	18.1/20.9	45/49	50/50	44/47	165/168	47/51	50/60	46/49	167/170
		104B	7.9/10.5	21.9/25.3	50/54	50/60	48/52	169/172	52/56	60/60	50/54	171/174
		105A	12.0/16.0	33.4/38.5	65/71	70/80	61/67	180/186	67/73	70/80	63/69	182/188
460-3-60	DD-STD	NONE	—	—	12	15	12	43	13	15	13	44
		106A	6.0	7.2	21	25	20	50	22	25	21	51
		107A	8.8	10.6	25	25	24	54	26	30	25	55
		108A	11.5	13.8	29	30	28	57	30	30	29	58
		109A	14.0	16.8	33	35	31	60	34	35	32	61
	MED	NONE	—	—	11	15	10	57	12	15	11	58
		106A	6.0	7.2	20	20	18	64	21	25	20	65
		107A	8.8	10.6	24	25	22	68	25	25	23	69
		108A	11.5	13.8	28	30	26	71	29	30	27	72
		109A	14.0	16.8	32	35	29	74	33	35	31	75
	HIGH	NONE	—	—	12	15	12	75	13	15	13	76
		106A	6.0	7.2	21	25	20	82	22	25	22	83
		107A	8.8	10.6	26	30	24	86	27	30	25	87
		108A	11.5	13.8	30	30	28	89	31	35	29	90
		109A	14.0	16.8	33	35	31	92	34	35	33	93
575-3-60	DD-STD	NONE	—	—	10	15	10	42	12	15	12	44
		297A	10.0	9.6	22	25	21	52	24	25	23	54
		298A	15.0	14.4	28	30	26	56	30	30	28	58
	MED	NONE	—	—	7	15	7	45	9	15	9	47
		297A	10.0	9.6	19	20	18	55	21	25	20	57
		298A	15.0	14.4	25	25	23	59	27	30	26	61
	HIGH	NONE	—	—	8	15	7	49	10	15	9	51
		297A	10.0	9.6	20	20	18	59	22	25	20	61
		298A	15.0	14.4	26	30	24	63	28	30	26	65

See Legend and Notes on page 58.

Table AJ — 50HCQA04 Unit Wire/Fuse or HACR Breaker Sizing Data Single Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	34	50	34	93	36	50	36	95
		101A	3.3/4.4	15.9/18.3	54/57	60/60	53/55	109/111	56/59	60/60	55/58	111/113
		102A	4.9/6.5	23.5/27.1	64/68	70/70	61/65	117/120	66/70	70/70	63/68	119/122
		103B	6.5/8.7	31.4/36.3	74/80	80/80	70/76	124/129	76/82	80/90	73/78	126/131
		104B	7.9/10.5	37.9/43.8	82/89	90/90	78/85	131/137	84/91	90/100	80/87	133/139
		102A+102A	9.8/13.0	46.9/54.2	93/102	100/110	88/97	187/201	95/104	100/110	90/99	189/203
208/230-3-60	DD-STD	NONE	—	—	27	30	27	87	29	35	29	89
		101A	3.3/4.4	9.2/10.6	38/40	45/45	38/39	96/98	40/42	45/45	40/42	98/100
		102A	4.9/6.5	13.6/15.6	44/46	50/50	43/45	101/103	46/48	50/50	45/47	103/105
		103B	6.5/8.7	18.1/20.9	49/53	50/60	48/51	105/108	51/55	60/60	50/53	107/110
		104B	7.9/10.5	21.9/25.3	54/58	60/60	52/56	109/112	56/60	60/60	55/58	111/114
		105A	12.0/16.0	33.4/38.5	68/75	70/80	66/71	120/126	70/77	70/80	68/74	122/128
	MED	NONE	—	—	24/24	30/30	25/24	116	26/26	30/30	27/26	118
		101A	3.3/4.4	9.2/10.6	36/37	40/40	35/36	125/127	38/39	45/45	37/39	127/129
		102A	4.9/6.5	13.6/15.6	41/44	45/45	40/42	130/132	43/46	45/50	42/44	132/134
		103B	6.5/8.7	18.1/20.9	47/50	50/50	45/48	134/137	49/52	50/60	48/50	136/139
		104B	7.9/10.5	21.9/25.3	52/56	60/60	50/53	138/141	54/58	60/60	52/56	140/143
		105A	12.0/16.0	33.4/38.5	66/72	70/80	63/69	149/155	68/74	70/80	65/71	151/157
	HIGH	NONE	—	—	28/28	30/30	28/28	152	30/29	35/35	30/30	154
		101A	3.3/4.4	9.2/10.6	39/41	45/45	39/40	161/163	41/43	45/45	41/43	163/165
		102A	4.9/6.5	13.6/15.6	45/47	50/50	44/46	166/168	47/49	50/50	46/48	168/170
		103B	6.5/8.7	18.1/20.9	50/54	50/60	49/52	170/173	52/56	60/60	51/54	172/175
		104B	7.9/10.5	21.9/25.3	55/59	60/60	53/57	174/177	57/61	60/70	56/59	176/179
		105A	12.0/16.0	33.4/38.5	69/76	70/80	67/72	185/191	71/78	80/80	69/75	187/193
460-3-60	DD-STD	NONE	—	—	14	20	14	45	15	20	16	46
		106A	6.0	7.2	23	25	23	52	24	25	24	53
		107A	8.8	10.6	28	30	27	56	29	30	28	57
		108A	11.5	13.8	32	35	30	59	33	35	31	60
		109A	14.0	16.8	35	35	34	62	36	40	35	63
	MED	NONE	—	—	13	15	13	59	14	15	14	60
		106A	6.0	7.2	22	25	21	66	23	25	22	67
		107A	8.8	10.6	26	30	25	70	27	30	26	71
		108A	11.5	13.8	30	30	29	73	31	35	30	74
		109A	14.0	16.8	34	35	32	76	35	35	33	77
	HIGH	NONE	—	—	15	20	15	77	16	20	16	78
		106A	6.0	7.2	24	25	23	84	25	25	24	85
		107A	8.8	10.6	28	30	27	88	29	30	28	89
		108A	11.5	13.8	32	35	30	91	33	35	32	92
		109A	14.0	16.8	36	40	34	94	37	40	35	95
575-3-60	DD-STD	NONE	—	—	11	15	12	44	13	15	14	46
		297A	10.0	9.6	23	25	23	54	25	25	25	56
		298A	15.0	14.4	29	30	28	58	31	35	30	60
	MED	NONE	—	—	9	15	9	47	11	15	11	49
		297A	10.0	9.6	21	25	20	57	23	25	22	59
		298A	15.0	14.4	27	30	25	61	29	30	27	63
	HIGH	NONE	—	—	9	15	9	51	11	15	11	53
		297A	10.0	9.6	21	25	20	61	23	25	22	63
		298A	15.0	14.4	27	30	26	65	29	30	28	67

See Legend and Notes on page 58.

Table AK — 50HCQA05 Unit Wire/Fuse or HACR Breaker Sizing Data
Single Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	34	50	33	119	36	50	35	121
		101A	3.3/4.4	15.9/18.3	54/57	60/60	51/54	135/137	56/59	60/60	53/56	137/139
		103B	6.5/8.7	31.4/36.3	73/79	80/80	69/75	150/155	75/81	80/90	71/77	152/157
		102A+102A	9.8/13.0	46.9/54.2	93/102	100/110	87/95	213/227	95/104	100/110	89/97	215/229
		103B+103B	13.1/17.4	62.8/72.5	113/125	125/125	105/116	245/264	114/127	125/150	107/118	247/266
		104B+104B	15.8/21.0	75.8/87.5	129/143	150/150	120/134	271/294	131/145	150/150	122/136	273/296
208/230-3-60	DD-STD	NONE	—	—	26	30	25	93	28	40	27	95
		102A	4.9/6.5	13.6/15.6	43/45	50/50	41/43	107/109	45/47	50/50	43/45	109/111
		103B	6.5/8.7	18.1/20.9	48/52	50/60	46/49	111/114	50/54	50/60	48/51	113/116
		105A	12.0/16.0	33.4/38.5	67/74	70/80	64/69	126/132	69/76	70/80	66/72	128/134
		104B+104B	15.8/21.0	43.8/50.5	80/89	80/90	76/83	181/194	82/91	90/100	78/85	183/196
	MED	NONE	—	—	23/23	30/30	23/22	122	25/25	30/30	25/24	124
		102A	4.9/6.5	13.6/15.6	40/43	45/50	38/40	136/138	42/45	50/50	40/42	138/140
		103B	6.5/8.7	18.1/20.9	46/49	50/50	43/46	140/143	48/51	50/60	46/49	142/145
		105A	12.0/16.0	33.4/38.5	65/71	70/80	61/67	155/161	67/73	70/80	63/69	157/163
		104B+104B	15.8/21.0	43.8/50.5	78/86	80/90	73/80	210/223	80/88	80/90	75/83	212/225
	HIGH	NONE	—	—	27/27	30/30	26/26	158	29/28	40/40	29/28	160
		102A	4.9/6.5	13.6/15.6	44/46	50/50	42/44	172/174	46/48	50/50	44/46	174/176
		103B	6.5/8.7	18.1/20.9	49/53	50/60	47/50	176/179	51/55	60/60	49/52	178/181
		105A	12.0/16.0	33.4/38.5	68/75	70/80	65/70	191/197	70/77	70/80	67/73	193/199
		104B+104B	15.8/21.0	43.8/50.5	81/90	90/90	77/84	246/259	83/92	90/100	79/86	248/261
460-3-60	DD-STD	NONE	—	—	13	15	13	47	14	15	14	48
		106A	6.0	7.2	22	25	21	54	23	25	22	55
		108A	11.5	13.8	30	30	28	61	31	35	30	62
		109A	14.0	16.8	34	35	32	64	35	35	33	65
		108A+108A	23.0	27.7	48	50	44	102	49	50	46	103
	MED	NONE	—	—	11	15	11	61	12	15	12	62
		106A	6.0	7.2	20	20	19	68	21	25	20	69
		108A	11.5	13.8	29	30	27	75	30	30	28	76
		109A	14.0	16.8	32	35	30	78	33	35	31	79
		108A+108A	23.0	27.7	46	50	43	116	47	50	44	117
	HIGH	NONE	—	—	13	15	13	79	14	20	14	80
		106A	6.0	7.2	22	25	21	86	23	25	22	87
		108A	11.5	13.8	30	30	29	93	31	35	30	94
		109A	14.0	16.8	34	35	32	96	35	35	33	97
		108A+108A	23.0	27.7	48	50	45	134	49	50	46	135
575-3-60	DD-STD	NONE	—	—	11	15	11	39	13	15	13	41
		297A	10.0	9.6	23	25	22	49	25	25	24	51
		298A	15.0	14.4	29	30	27	53	31	35	29	55
	MED	NONE	—	—	8	15	8	42	10	15	10	44
		297A	10.0	9.6	20	20	19	52	22	25	21	54
		298A	15.0	14.4	26	30	24	56	28	30	27	58
	HIGH	NONE	—	—	9	15	8	46	11	15	10	48
		297A	10.0	9.6	21	25	19	56	23	25	22	58
		298A	15.0	14.4	27	30	25	60	29	30	27	62

See Legend and Notes on page 58.

Table AK — 50HCQA05 Unit Wire/Fuse or HACR Breaker Sizing Data Single Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	39	50	38	124	41	60	41	126
		101A	3.3/4.4	15.9/18.3	59/62	60/70	57/59	140/142	61/64	70/70	59/62	142/144
		103B	6.5/8.7	31.4/36.3	78/84	80/90	75/80	155/160	80/86	80/90	77/82	157/162
		102A+102A	9.8/13.0	46.9/54.2	97/107	100/110	92/101	218/232	99/108	100/110	95/103	220/234
		103B+103B	13.1/17.4	62.8/72.5	117/129	125/150	111/122	250/269	119/131	125/150	113/124	252/271
		104B+104B	15.8/21.0	75.8/87.5	134/148	150/150	126/139	276/299	135/150	150/150	128/141	278/301
208/230-3-60	DD-STD	NONE	—	—	30	40	31	98	32	40	33	100
		102A	4.9/6.5	13.6/15.6	47/50	50/50	46/49	112/114	49/52	50/60	49/51	114/116
		103B	6.5/8.7	18.1/20.9	53/57	60/60	52/55	116/119	55/58	60/60	54/57	118/121
		105A	12.0/16.0	33.4/38.5	72/79	80/80	69/75	131/137	74/80	80/90	71/77	133/139
		104B+104B	15.8/21.0	43.8/50.5	85/94	90/100	81/89	186/199	87/95	90/100	83/91	188/201
	MED	NONE	—	—	28/28	40/40	28/28	127	30/30	40/40	30/30	129
		102A	4.9/6.5	13.6/15.6	45/47	50/50	44/46	141/143	47/49	50/50	46/48	143/145
		103B	6.5/8.7	18.1/20.9	51/54	60/60	49/52	145/148	53/56	60/60	51/54	147/150
		105A	12.0/16.0	33.4/38.5	70/76	70/80	67/72	160/166	72/78	80/80	69/74	162/168
		104B+104B	15.8/21.0	43.8/50.5	83/91	90/100	79/86	215/228	85/93	90/100	81/88	217/230
	HIGH	NONE	—	—	31/31	40/40	32/32	163	33/33	45/45	34/34	165
		102A	4.9/6.5	13.6/15.6	48/51	50/60	47/50	177/179	50/53	50/60	50/52	179/181
		103B	6.5/8.7	18.1/20.9	54/57	60/60	53/56	181/184	56/59	60/60	55/58	183/186
		105A	12.0/16.0	33.4/38.5	73/79	80/80	70/76	196/202	75/81	80/90	72/78	198/204
		104B+104B	15.8/21.0	43.8/50.5	86/94	90/100	82/90	251/264	88/96	90/100	84/92	253/266
460-3-60	DD-STD	NONE	—	—	15	20	15	49	16	20	16	50
		106A	6.0	7.2	24	25	23	56	25	25	24	57
		108A	11.5	13.8	32	35	31	63	33	35	32	64
		109A	14.0	16.8	36	40	34	66	37	40	36	67
		108A+108A	23.0	27.7	50	50	47	104	51	60	48	105
	MED	NONE	—	—	14	15	13	63	15	20	14	64
		106A	6.0	7.2	23	25	22	70	24	25	23	71
		108A	11.5	13.8	31	35	29	77	32	35	30	78
		109A	14.0	16.8	35	35	33	80	36	40	34	81
		108A+108A	23.0	27.7	48	50	45	118	49	50	46	119
	HIGH	NONE	—	—	15	20	15	81	16	20	16	82
		106A	6.0	7.2	24	25	24	88	25	25	25	89
		108A	11.5	13.8	33	35	31	95	34	35	32	96
		109A	14.0	16.8	36	40	35	98	37	40	36	99
		108A+108A	23.0	27.7	50	50	47	136	51	60	48	137
575-3-60	DD-STD	NONE	—	—	12	15	13	41	14	20	15	43
		297A	10.0	9.6	24	25	24	51	26	30	26	53
		298A	15.0	14.4	30	30	29	55	32	35	31	57
	MED	NONE	—	—	10	15	10	44	12	15	12	46
		297A	10.0	9.6	22	25	21	54	24	25	23	56
		298A	15.0	14.4	28	30	26	58	30	30	29	60
	HIGH	NONE	—	—	10	15	10	48	12	15	12	50
		297A	10.0	9.6	22	25	21	58	24	25	23	60
		298A	15.0	14.4	28	30	27	62	30	30	29	64

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AL — 50HCQA06 Unit Wire/Fuse or HACR Breaker Sizing Data
Single Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	41	60	39	144	42	60	41	146
		102A	4.9/6.5	23.5/27.1	70/74	80/80	66/70	168/171	72/76	80/80	68/72	170/173
		103B	6.5/8.7	31.4/36.3	80/86	80/100	75/81	175/180	82/88	90/100	77/83	177/182
		102A+102A	9.8/13.0	46.9/54.2	99/108	100/110	93/101	238/252	101/110	110/110	95/103	240/254
		103B+103B	13.1/17.4	62.8/72.5	119/131	125/150	111/122	270/289	121/133	125/150	113/124	272/291
		104B+104B	15.8/21.0	75.8/87.5	135/150	150/150	126/139	296/319	137/152	150/175	128/142	298/321
208/230-3-60	DD-STD	NONE	—	—	29	40	28	120	31	45	31	122
		102A	4.9/6.5	13.6/15.6	46/49	50/60	44/46	134/136	48/51	60/60	46/49	136/138
		104B	7.9/10.5	21.9/25.3	57/61	60/70	54/58	142/145	58/63	60/70	56/60	144/147
		105A	12.0/16.0	33.4/38.5	71/77	80/80	67/73	153/159	73/79	80/80	69/75	155/161
		104B+104B	15.8/21.0	43.8/50.5	84/92	90/100	79/86	208/221	86/94	90/100	81/89	210/223
		104B+105A	19.9/26.5	55.2/63.8	98/109	100/110	92/102	230/248	100/111	100/125	94/104	232/250
	MED	NONE	—	—	30/30	45/45	30/29	185	32/32	45/45	32/32	187
		102A	4.9/6.5	13.6/15.6	47/50	50/60	45/47	199/201	49/51	60/60	47/50	201/203
		104B	7.9/10.5	21.9/25.3	58/62	60/70	55/59	207/210	59/64	60/70	57/61	209/212
		105A	12.0/16.0	33.4/38.5	72/78	80/80	68/74	218/224	74/80	80/80	70/76	220/226
		104B+104B	15.8/21.0	43.8/50.5	85/93	90/100	80/88	273/286	87/95	90/100	82/90	275/288
		104B+105A	19.9/26.5	55.2/63.8	99/110	100/110	93/103	295/313	101/112	110/125	95/105	297/315
	HIGH	NONE	—	—	30/30	45/45	30/29	185	32/32	45/45	32/32	187
		102A	4.9/6.5	13.6/15.6	47/50	50/60	45/47	199/201	49/51	60/60	47/50	201/203
		104B	7.9/10.5	21.9/25.3	58/62	60/70	55/59	207/210	59/64	60/70	57/61	209/212
		105A	12.0/16.0	33.4/38.5	72/78	80/80	68/74	218/224	74/80	80/80	70/76	220/226
		104B+104B	15.8/21.0	43.8/50.5	85/93	90/100	80/88	273/286	87/95	90/100	82/90	275/288
		104B+105A	19.9/26.5	55.2/63.8	99/110	100/110	93/103	295/313	101/112	110/125	95/105	297/315
460-3-60	DD-STD	NONE	—	—	14	20	14	58	15	20	15	59
		106A	6.0	7.2	23	25	22	65	24	25	23	66
		108A	11.5	13.8	31	35	29	72	32	35	31	73
		109A	14.0	16.8	35	35	33	75	36	40	34	76
		108A+108A	23.0	27.7	49	50	45	113	50	50	47	114
		108A+109A	25.5	30.7	52	60	49	119	53	60	50	120
	MED	NONE	—	—	14	20	14	90	15	20	15	91
		106A	6.0	7.2	23	25	22	97	24	25	23	98
		108A	11.5	13.8	31	35	30	104	32	35	31	105
		109A	14.0	16.8	35	35	33	107	36	40	34	108
		108A+108A	23.0	27.7	49	50	46	145	50	50	47	146
		108A+109A	25.5	30.7	53	60	49	151	54	60	50	152
	HIGH	NONE	—	—	14	20	14	90	15	20	15	91
		106A	6.0	7.2	23	25	22	97	24	25	23	98
		108A	11.5	13.8	31	35	30	104	32	35	31	105
		109A	14.0	16.8	35	35	33	107	36	40	34	108
		108A+108A	23.0	27.7	49	50	46	145	50	50	47	146
		108A+109A	25.5	30.7	53	60	49	151	54	60	50	152
575-3-60	DD-STD	NONE	—	—	12	15	11	46	14	15	14	48
		298A	15.0	14.4	30	30	28	60	32	35	30	62
		301A	25.0	24.1	42	45	39	94	44	45	41	96
	MED	NONE	—	—	10	15	9	53	12	15	11	55
		298A	15.0	14.4	28	30	26	67	30	30	28	69
		301A	25.0	24.1	40	40	37	101	42	45	39	103
	HIGH	NONE	—	—	10	15	10	64	12	15	12	66
		298A	15.0	14.4	28	30	27	78	30	30	29	80
		301A	25.0	24.1	41	45	38	112	42	45	40	114

See Legend and Notes on page 58.

Table AL — 50HCQA06 Unit Wire/Fuse or HACR Breaker Sizing Data Single Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-1-60	DD-STD	NONE	—	—	45	60	44	149	47	60	47	151
		102A	4.9/6.5	23.5/27.1	75/79	80/80	71/76	173/176	77/81	80/90	74/78	175/178
		103B	6.5/8.7	31.4/36.3	85/91	100/100	81/86	180/185	86/93	100/100	83/88	182/187
		102A+102A	9.8/13.0	46.9/54.2	104/113	110/125	98/107	243/257	106/115	110/125	101/109	245/259
		103B+103B	13.1/17.4	62.8/72.5	124/136	125/150	117/128	275/294	126/138	150/150	119/130	277/296
		104B+104B	15.8/21.0	75.8/87.5	140/155	150/175	132/145	301/324	142/157	150/175	134/147	303/326
208/230-3-60	DD-STD	NONE	—	—	34	45	34	125	36	50	36	127
		102A	4.9/6.5	13.6/15.6	51/53	60/60	50/52	139/141	53/55	60/60	52/54	141/143
		104B	7.9/10.5	21.9/25.3	61/66	70/70	59/63	147/150	63/67	70/70	61/65	149/152
		105A	12.0/16.0	33.4/38.5	76/82	80/90	72/78	158/164	78/84	80/90	75/80	160/166
		104B+104B	15.8/21.0	43.8/50.5	89/97	90/100	84/92	213/226	91/99	100/100	86/94	215/228
		104B+105A	19.9/26.5	55.2/63.8	103/114	110/125	97/107	235/253	105/116	110/125	100/109	237/255
	MED	NONE	—	—	35/35	50/50	35/35	190	37/37	50/50	37/37	192
		102A	4.9/6.5	13.6/15.6	52/54	60/60	51/53	204/206	54/56	60/60	53/55	206/208
		104B	7.9/10.5	21.9/25.3	62/66	70/70	60/64	212/215	64/68	70/70	62/66	214/217
		105A	12.0/16.0	33.4/38.5	77/83	80/90	73/79	223/229	79/85	80/90	76/81	225/231
		104B+104B	15.8/21.0	43.8/50.5	90/98	90/100	85/93	278/291	92/100	100/100	88/95	280/293
		104B+105A	19.9/26.5	55.2/63.8	104/115	110/125	99/108	300/318	106/116	110/125	101/111	302/320
	HIGH	NONE	—	—	35/35	50/50	35/35	190	37/37	50/50	37/37	192
		102A	4.9/6.5	13.6/15.6	52/54	60/60	51/53	204/206	54/56	60/60	53/55	206/208
		104B	7.9/10.5	21.9/25.3	62/66	70/70	60/64	212/215	64/68	70/70	62/66	214/217
		105A	12.0/16.0	33.4/38.5	77/83	80/90	73/79	223/229	79/85	80/90	76/81	225/231
		104B+104B	15.8/21.0	43.8/50.5	90/98	90/100	85/93	278/291	92/100	100/100	88/95	280/293
		104B+105A	19.9/26.5	55.2/63.8	104/115	110/125	99/108	300/318	106/116	110/125	101/111	302/320
460-3-60	DD-STD	NONE	—	—	16	20	16	60	17	20	17	61
		106A	6.0	7.2	25	25	24	67	26	30	26	68
		108A	11.5	13.8	33	35	32	74	34	35	33	75
		109A	14.0	16.8	37	40	35	77	38	40	37	78
		108A+108A	23.0	27.7	51	60	48	115	52	60	49	116
		108A+109A	25.5	30.7	55	60	51	121	56	60	53	122
	MED	NONE	—	—	16	20	16	92	17	20	17	93
		106A	6.0	7.2	25	30	25	99	26	30	26	100
		108A	11.5	13.8	34	35	32	106	35	35	33	107
		109A	14.0	16.8	37	40	36	109	38	40	37	110
		108A+108A	23.0	27.7	51	60	48	147	52	60	49	148
		108A+109A	25.5	30.7	55	60	52	153	56	60	53	154
	HIGH	NONE	—	—	16	20	16	92	17	20	17	93
		106A	6.0	7.2	25	30	25	99	26	30	26	100
		108A	11.5	13.8	34	35	32	106	35	35	33	107
		109A	14.0	16.8	37	40	36	109	38	40	37	110
		108A+108A	23.0	27.7	51	60	48	147	52	60	49	148
		108A+109A	25.5	30.7	55	60	52	153	56	60	53	154
575-3-60	DD-STD	NONE	—	—	13	15	13	48	15	20	16	50
		298A	15.0	14.4	31	35	30	62	33	35	32	64
		301A	25.0	24.1	43	45	41	96	45	45	43	98
	MED	NONE	—	—	11	15	11	55	13	15	13	57
		298A	15.0	14.4	29	30	28	69	31	35	30	71
		301A	25.0	24.1	41	45	39	103	43	45	41	105
	HIGH	NONE	—	—	12	15	12	66	14	15	14	68
		298A	15.0	14.4	30	30	29	80	32	35	31	82
		301A	25.0	24.1	42	45	40	114	44	45	42	116

See Legend and Notes on page 58.

Table AM — 50HCQA07 Unit Wire/Fuse or HACR Breaker Sizing Data
Single Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	33	50	32	161	37	50	36	165
		264A	4.9/6.5	13.6/15.6	50/53	60/60	48/50	175/177	54/56	60/60	52/54	179/181
		117A	7.8/10.4	21.7/25.0	60/64	60/70	57/61	183/186	64/68	70/80	61/65	187/190
		110A	12.0/16.0	33.4/38.5	75/81	80/90	70/76	194/200	79/85	80/90	75/81	198/204
		117A+117A	15.8/21.0	43.8/50.5	88/96	90/100	82/90	249/262	92/100	100/100	87/94	253/266
		110A+117A	19.9/26.5	55.2/63.8	102/113	110/125	95/105	271/289	106/117	110/125	100/110	275/293
	MED	NONE	—	—	35	50	35	198	39	50	39	202
		264A	4.9/6.5	13.6/15.6	52/55	60/60	50/53	212/214	56/59	60/60	55/57	216/218
		117A	7.8/10.4	21.7/25.0	63/67	70/70	60/63	220/223	66/71	80/80	64/68	224/227
		110A	12.0/16.0	33.4/38.5	77/84	80/90	73/79	231/237	81/87	90/90	77/83	235/241
		117A+117A	15.8/21.0	43.8/50.5	90/99	90/100	85/93	286/299	94/102	100/110	89/97	290/303
		110A+117A	19.9/26.5	55.2/63.8	104/115	110/125	98/108	308/326	108/119	110/125	102/112	312/330
	HIGH	NONE	—	—	42/41	60/50	42/41	230	45/44	60/60	46/45	234
		264A	4.9/6.5	13.6/15.6	59/60	60/70	57/59	244/246	62/64	70/70	62/63	248/250
		117A	7.8/10.4	21.7/25.0	69/72	80/80	67/69	252/255	72/76	80/80	71/74	256/259
		110A	12.0/16.0	33.4/38.5	83/89	90/90	80/85	263/269	87/93	90/100	84/89	267/273
		117A+117A	15.8/21.0	43.8/50.5	96/104	100/110	92/99	318/331	100/108	100/110	96/103	322/335
		110A+117A	19.9/26.5	55.2/63.8	111/120	125/125	105/114	340/358	114/124	125/125	109/118	344/362
460-3-60	STD	NONE	—	—	15	20	14	79	17	20	16	81
		265A	6.0	7.2	24	25	23	86	26	30	25	88
		266A	11.5	13.8	32	35	30	93	34	35	32	95
		267A	14.0	16.8	36	40	34	96	38	40	36	98
		268A	23.0	27.7	50	50	46	107	51	60	48	109
		269A	25.5	30.7	53	60	50	110	55	60	52	112
	MED	NONE	—	—	16	20	15	98	18	25	17	100
		265A	6.0	7.2	25	30	23	105	27	30	26	107
		266A	11.5	13.8	33	35	31	112	35	35	33	114
		267A	14.0	16.8	37	40	35	115	39	40	37	117
		268A	23.0	27.7	50	50	47	126	52	60	49	128
		269A	25.5	30.7	54	60	50	129	56	60	53	131
	HIGH	NONE	—	—	19	25	19	114	21	25	21	116
		265A	6.0	7.2	28	30	27	121	30	30	29	123
		266A	11.5	13.8	36	40	35	128	38	40	37	130
		267A	14.0	16.8	40	40	38	131	42	45	40	133
		268A	23.0	27.7	53	60	50	142	55	60	53	144
		269A	25.5	30.7	57	60	54	145	59	60	56	147
575-3-60	STD	NONE	—	—	12	15	11	66	15	20	15	70
		118A	18.0	17.3	33	35	31	83	37	40	35	87
		299A	28.0	26.9	45	45	42	93	49	50	46	97
	MED	NONE	—	—	13	15	12	81	17	20	17	85
		118A	18.0	17.3	34	35	32	98	38	40	36	102
		299A	28.0	26.9	46	50	43	108	50	50	47	112
	HIGH	NONE	—	—	16	20	15	95	19	25	20	99
		118A	18.0	17.3	37	40	35	112	41	45	40	116
		299A	28.0	26.9	49	50	46	122	53	60	51	126

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AM — 50HCQA07 Unit Wire/fuse or HACR Breaker Sizing Data Single Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	38	50	37	166	42	60	42	170
		264A	4.9/6.5	13.6/15.6	55/57	60/60	53/55	180/182	59/61	60/70	58/60	184/186
		117A	7.8/10.4	21.7/25.0	65/69	70/80	62/66	188/191	69/73	80/80	67/71	192/195
		110A	12.0/16.0	33.4/38.5	80/86	80/90	76/82	199/205	84/90	90/90	80/86	203/209
		117A+117A	15.8/21.0	43.8/50.5	93/101	100/110	88/96	254/267	97/105	100/110	92/100	258/271
		110A+117A	19.9/26.5	55.2/63.8	107/118	110/125	101/111	276/294	111/122	125/125	105/115	280/298
	MED	NONE	—	—	40	50	40	203	44	60	45	207
		264A	4.9/6.5	13.6/15.6	57/60	60/70	56/58	217/219	61/64	70/70	60/62	221/223
		117A	7.8/10.4	21.7/25.0	67/72	80/80	65/69	225/228	71/75	80/80	69/73	229/232
		110A	12.0/16.0	33.4/38.5	82/88	90/90	79/84	236/242	86/92	90/100	83/89	240/246
		117A+117A	15.8/21.0	43.8/50.5	95/103	100/110	91/98	291/304	99/107	100/110	95/103	295/308
		110A+117A	19.9/26.5	55.2/63.8	109/120	110/125	104/114	313/331	113/124	125/125	108/118	317/335
	HIGH	NONE	—	—	46/45	60/60	47/46	235	50/49	60/60	52/50	239
		264A	4.9/6.5	13.6/15.6	63/65	70/80	63/64	249/251	67/69	80/80	67/68	253/255
		117A	7.8/10.4	21.7/25.0	73/77	80/80	72/75	257/260	77/81	80/90	76/79	261/264
		110A	12.0/16.0	33.4/38.5	88/94	90/100	86/90	268/274	92/97	100/100	90/95	272/278
		117A+117A	15.8/21.0	43.8/50.5	101/109	110/110	98/104	323/336	105/112	110/125	102/109	327/340
		110A+117A	19.9/26.5	55.2/63.8	115/125	125/125	111/119	345/363	119/129	125/150	115/124	349/367
460-3-60	STD	NONE	—	—	17	20	17	81	19	25	19	83
		265A	6.0	7.2	26	30	25	88	28	30	27	90
		266A	11.5	13.8	34	35	33	95	36	40	35	97
		267A	14.0	16.8	38	40	36	98	40	40	38	100
		268A	23.0	27.7	52	60	49	109	54	60	51	111
		269A	25.5	30.7	55	60	52	112	57	60	54	114
	MED	NONE	—	—	18	25	18	100	20	25	20	102
		265A	6.0	7.2	27	30	26	107	29	30	28	109
		266A	11.5	13.8	35	35	34	114	37	40	36	116
		267A	14.0	16.8	39	40	37	117	41	45	39	119
		268A	23.0	27.7	53	60	50	128	54	60	52	130
		269A	25.5	30.7	56	60	53	131	58	60	55	133
	HIGH	NONE	—	—	21	25	21	116	23	30	23	118
		265A	6.0	7.2	30	30	29	123	32	35	32	125
		266A	11.5	13.8	38	40	37	130	40	40	39	132
		267A	14.0	16.8	42	45	40	133	44	45	43	135
		268A	23.0	27.7	56	60	53	144	57	60	55	146
		269A	25.5	30.7	59	60	56	147	61	70	59	149
575-3-60	STD	NONE	—	—	13	15	13	68	17	20	17	72
		118A	18.0	17.3	35	35	33	85	39	40	37	89
		299A	28.0	26.9	47	50	44	95	51	60	48	99
	MED	NONE	—	—	14	20	14	83	18	20	19	87
		118A	18.0	17.3	36	40	34	100	40	40	38	104
		299A	28.0	26.9	48	50	45	110	52	60	49	114
	HIGH	NONE	—	—	17	20	17	97	21	25	22	101
		118A	18.0	17.3	39	40	37	114	43	45	42	118
		299A	28.0	26.9	51	60	48	124	55	60	53	128

See Legend and Notes on page 58.

Table AN — 50HCQD07 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	32	50	31	161	36	50	36	165
		264A	4.9/6.5	13.6/15.6	49/52	60/60	47/49	175/177	53/56	60/60	51/53	179/181
		117A	7.8/10.4	21.7/25.0	59/64	60/70	56/60	183/186	63/67	70/70	60/64	187/190
		110A	12.0/16.0	33.4/38.5	74/80	80/80	70/75	194/200	78/84	80/90	74/80	198/204
		117A+117A	15.8/21.0	43.8/50.5	87/95	90/100	82/89	249/262	91/99	100/100	86/94	253/266
		110A+117A	19.9/26.5	55.2/63.8	101/112	110/125	95/105	271/289	105/116	110/125	99/109	275/293
	MED	NONE	—	—	35	50	34	198	38	50	38	202
		264A	4.9/6.5	13.6/15.6	52/54	60/60	49/52	212/214	55/58	60/60	54/56	216/218
		117A	7.8/10.4	21.7/25.0	62/66	70/70	59/63	220/223	66/70	70/80	63/67	224/227
		110A	12.0/16.0	33.4/38.5	76/83	80/90	72/78	231/237	80/87	80/90	77/82	235/241
		117A+117A	15.8/21.0	43.8/50.5	89/98	90/100	84/92	286/299	93/102	100/110	89/96	290/303
		110A+117A	19.9/26.5	55.2/63.8	104/114	110/125	97/107	308/326	107/118	110/125	102/112	312/330
	HIGH	NONE	—	—	41/40	50/50	41/40	230	44/44	60/60	45/44	234
		264A	4.9/6.5	13.6/15.6	58/59	60/60	56/58	244/246	61/63	70/70	61/62	248/250
		117A	7.8/10.4	21.7/25.0	68/71	80/80	66/69	252/255	72/75	80/80	70/73	256/259
		110A	12.0/16.0	33.4/38.5	82/88	90/90	79/84	263/269	86/92	90/100	84/88	267/273
		117A+117A	15.8/21.0	43.8/50.5	95/103	100/110	91/98	318/331	99/107	100/110	96/102	322/335
		110A+117A	19.9/26.5	55.2/63.8	110/120	110/125	104/113	340/358	113/123	125/125	109/118	344/362
460-3-60	STD	NONE	—	—	17	25	16	79	19	25	18	81
		265A	6.0	7.2	26	30	24	86	28	30	26	88
		266A	11.5	13.8	34	35	32	93	36	40	34	95
		267A	14.0	16.8	38	40	35	96	40	40	37	98
		268A	23.0	27.7	51	60	48	107	53	60	50	109
		269A	25.5	30.7	55	60	51	110	57	60	53	112
	MED	NONE	—	—	18	25	17	98	19	25	19	100
		265A	6.0	7.2	27	30	25	105	28	30	27	107
		266A	11.5	13.8	35	40	33	112	37	40	35	114
		267A	14.0	16.8	39	40	36	115	40	45	38	117
		268A	23.0	27.7	52	60	49	126	54	60	51	128
		269A	25.5	30.7	56	60	52	129	58	60	54	131
	HIGH	NONE	—	—	21	25	20	114	22	30	22	116
		265A	6.0	7.2	30	30	29	121	31	35	31	123
		266A	11.5	13.8	38	40	36	128	40	45	38	130
		267A	14.0	16.8	42	45	40	131	43	45	42	133
		268A	23.0	27.7	55	60	52	142	57	60	54	144
		269A	25.5	30.7	59	60	56	145	61	70	58	147
575-3-60	STD	NONE	—	—	13	20	12	66	17	20	16	70
		118A	18.0	17.3	35	35	32	83	38	40	36	87
		299A	28.0	26.9	47	50	43	93	50	50	47	97
	MED	NONE	—	—	14	20	13	81	18	25	18	85
		118A	18.0	17.3	36	40	33	98	40	40	38	102
		299A	28.0	26.9	48	50	44	108	52	60	49	112
	HIGH	NONE	—	—	17	20	17	95	21	25	21	99
		118A	18.0	17.3	39	40	37	112	42	45	41	116
		299A	28.0	26.9	51	60	48	122	54	60	52	126

See Legend and Notes on page 58.

Table AN — 50HCQD07 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	37	50	37	166	41	50	41	170
		264A	4.9/6.5	13.6/15.6	54/57	60/60	52/55	180/182	58/60	60/70	57/59	184/186
		117A	7.8/10.4	21.7/25.0	64/68	70/80	62/65	188/191	68/72	80/80	66/70	192/195
		110A	12.0/16.0	33.4/38.5	79/85	80/90	75/81	199/205	83/89	90/90	79/85	203/209
		117A+117A	15.8/21.0	43.8/50.5	92/100	100/100	87/95	254/267	96/104	100/110	91/99	258/271
		110A+117A	19.9/26.5	55.2/63.8	106/117	110/125	100/110	276/294	110/121	110/125	105/114	280/298
	MED	NONE	—	—	39	50	39	203	43	60	44	207
		264A	4.9/6.5	13.6/15.6	56/59	60/60	55/57	217/219	60/63	70/70	59/62	221/223
		117A	7.8/10.4	21.7/25.0	67/71	70/80	64/68	225/228	70/74	80/80	69/72	229/232
		110A	12.0/16.0	33.4/38.5	81/88	90/90	78/84	236/242	85/91	90/100	82/88	240/246
		117A+117A	15.8/21.0	43.8/50.5	94/103	100/110	90/97	291/304	98/106	100/110	94/102	295/308
		110A+117A	19.9/26.5	55.2/63.8	108/119	110/125	103/113	313/331	112/123	125/125	107/117	317/335
	HIGH	NONE	—	—	45/45	60/60	46/45	235	49/48	60/60	51/50	239
		264A	4.9/6.5	13.6/15.6	62/64	70/70	62/63	249/251	66/68	80/80	66/68	253/255
		117A	7.8/10.4	21.7/25.0	73/76	80/80	71/74	257/260	76/80	80/80	76/78	261/264
		110A	12.0/16.0	33.4/38.5	87/93	90/100	85/90	268/274	91/97	100/100	89/94	272/278
		117A+117A	15.8/21.0	43.8/50.5	100/108	100/110	97/103	323/336	104/112	110/125	101/108	327/340
		110A+117A	19.9/26.5	55.2/63.8	114/124	125/125	110/119	345/363	118/128	125/150	114/123	349/367
460-3-60	STD	NONE	—	—	19	25	19	81	21	30	21	83
		265A	6.0	7.2	28	30	27	88	30	30	29	90
		266A	11.5	13.8	36	40	34	95	38	40	36	97
		267A	14.0	16.8	40	45	38	98	42	45	40	100
		268A	23.0	27.7	54	60	50	109	55	60	52	111
		269A	25.5	30.7	57	60	54	112	59	60	56	114
	MED	NONE	—	—	20	25	19	100	22	30	22	102
		265A	6.0	7.2	29	30	28	107	31	35	30	109
		266A	11.5	13.8	37	40	35	114	39	40	37	116
		267A	14.0	16.8	41	45	39	117	43	45	41	119
		268A	23.0	27.7	54	60	51	128	56	60	53	130
		269A	25.5	30.7	58	60	55	131	60	60	57	133
	HIGH	NONE	—	—	23	30	23	116	25	30	25	118
		265A	6.0	7.2	32	35	31	123	34	40	33	125
		266A	11.5	13.8	40	45	39	130	42	45	41	132
		267A	14.0	16.8	44	45	42	133	46	50	44	135
		268A	23.0	27.7	57	60	55	144	59	60	57	146
		269A	25.5	30.7	61	70	58	147	63	70	60	149
575-3-60	STD	NONE	—	—	15	20	14	68	18	25	18	72
		118A	18.0	17.3	36	40	34	85	40	40	38	89
		299A	28.0	26.9	48	50	45	95	52	60	49	99
	MED	NONE	—	—	16	20	15	83	20	25	20	87
		118A	18.0	17.3	37	40	35	100	41	45	40	104
		299A	28.0	26.9	49	50	46	110	53	60	51	114
	HIGH	NONE	—	—	19	25	19	97	22	25	23	101
		118A	18.0	17.3	40	40	39	114	44	45	43	118
		299A	28.0	26.9	52	60	50	124	56	60	54	128

See Legend and Notes on page 58.

Table AO — 50HCQD08 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	38	50	40	191	42	50	44	195
		117A	7.8/10.4	21.7/25.0	65/69	70/70	65/68	213/216	69/73	70/80	69/73	217/220
		110A	12.0/16.0	33.4/38.5	80/86	80/90	78/84	224/230	84/90	90/90	82/88	228/234
		111A	18.6/24.8	51.7/59.7	103/113	110/125	99/108	243/251	107/117	110/125	103/113	247/255
		112A	24.0/32.0	66.7/77.0	122/134	125/150	116/128	258/268	125/138	125/150	121/132	262/272
		112A+117A	31.8/42.4	88.4/102.0	149/166	150/175	141/157	368/395	152/169	175/175	146/161	372/399
	MED	NONE	—	—	40/40	50/50	42/41	229	44/43	50/50	46/46	233
		117A	7.8/10.4	21.7/25.0	67/71	70/80	66/70	251/254	71/75	80/80	71/74	255/258
		110A	12.0/16.0	33.4/38.5	82/88	90/90	80/86	262/268	85/92	90/100	84/90	266/272
		111A	18.6/24.8	51.7/59.7	104/114	110/125	101/110	281/289	108/118	110/125	105/114	285/293
		112A	24.0/32.0	66.7/77.0	123/136	125/150	118/130	296/306	127/140	150/150	123/134	300/310
		112A+117A	31.8/42.4	88.4/102.0	150/167	150/175	143/159	406/433	154/171	175/175	148/163	410/437
	HIGH	NONE	—	—	44	50	46	258	47	60	50	262
		117A	7.8/10.4	21.7/25.0	71/75	80/80	71/75	280/283	74/79	80/80	75/79	284/287
		110A	12.0/16.0	33.4/38.5	85/92	90/100	84/90	291/297	89/95	90/100	89/94	295/301
		111A	18.6/24.8	51.7/59.7	108/118	110/125	105/114	310/318	112/122	125/125	110/119	314/322
		112A	24.0/32.0	66.7/77.0	127/140	150/150	122/134	325/335	131/144	150/150	127/139	329/339
		112A+117A	31.8/42.4	88.4/102.0	154/171	175/175	147/163	435/462	158/175	175/175	152/167	439/466
460-3-60	STD	NONE	—	—	18	20	19	95	20	25	21	97
		116B	13.9	16.7	39	40	38	112	41	45	40	114
		113B	16.5	19.8	43	45	42	115	45	45	44	117
		114B	27.8	33.4	60	60	57	128	62	70	59	130
		115B	33.0	39.7	68	70	65	135	70	70	67	137
		128B	41.7	50.2	81	90	77	145	83	90	79	147
	MED	NONE	—	—	19	25	20	114	21	25	22	116
		116B	13.9	16.7	40	40	39	131	42	45	41	133
		113B	16.5	19.8	44	45	43	134	46	50	45	136
		114B	27.8	33.4	61	70	58	147	63	70	60	149
		115B	33.0	39.7	69	70	65	154	71	80	68	156
		128B	41.7	50.2	82	90	78	164	84	90	80	166
	HIGH	NONE	—	—	21	25	22	129	23	25	24	131
		116B	13.9	16.7	42	45	41	146	44	45	43	148
		113B	16.5	19.8	46	50	45	149	48	50	47	151
		114B	27.8	33.4	63	70	60	162	65	70	62	164
		115B	33.0	39.7	71	80	68	169	73	80	70	171
		128B	41.7	50.2	84	90	80	179	86	90	82	181
575-3-60	STD	NONE	—	—	13	15	13	77	17	20	18	81
		118A	18.0	17.3	35	35	33	94	39	40	38	98
		119A	36.0	34.6	56	60	53	112	60	60	58	116
	MED	NONE	—	—	14	15	14	81	17	20	18	85
		118A	18.0	17.3	35	35	34	98	39	40	38	102
		119A	36.0	34.6	57	60	54	116	61	70	58	120
	HIGH	NONE	—	—	14	20	15	92	18	20	19	96
		118A	18.0	17.3	36	40	35	109	40	40	39	113
		119A	36.0	34.6	58	60	55	127	61	70	59	131

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AO — 50HCQD08 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	43	50	45	196	47	50	49	200
		117A	7.8/10.4	21.7/25.0	70/74	70/80	70/74	218/221	74/78	80/80	74/78	222/225
		110A	12.0/16.0	33.4/38.5	85/91	90/100	83/89	229/235	88/95	90/100	88/94	233/239
		111A	18.6/24.8	51.7/59.7	108/118	110/125	105/114	248/256	111/121	125/125	109/118	252/260
		112A	24.0/32.0	66.7/77.0	126/139	150/150	122/134	263/273	130/143	150/150	126/138	267/277
		112A+117A	31.8/42.4	88.4/102.0	153/170	175/175	147/162	373/400	157/174	175/175	151/167	377/404
	MED	NONE	—	—	45/44	50/50	47/47	234	48/48	60/60	51/51	238
		117A	7.8/10.4	21.7/25.0	72/76	80/80	72/76	256/259	76/79	80/80	76/80	260/263
		110A	12.0/16.0	33.4/38.5	86/93	90/100	85/91	267/273	90/96	90/100	90/95	271/277
		111A	18.6/24.8	51.7/59.7	109/119	110/125	106/115	286/294	113/123	125/125	111/120	290/298
		112A	24.0/32.0	66.7/77.0	128/141	150/150	124/135	301/311	132/144	150/150	128/140	305/315
		112A+117A	31.8/42.4	88.4/102.0	155/172	175/175	149/164	411/438	159/176	175/200	153/168	415/442
	HIGH	NONE	—	—	48	60	51	263	52	60	56	267
		117A	7.8/10.4	21.7/25.0	75/80	80/80	76/80	285/288	79/83	80/90	81/84	289/292
		110A	12.0/16.0	33.4/38.5	90/96	90/100	90/96	296/302	94/100	100/100	94/100	300/306
		111A	18.6/24.8	51.7/59.7	113/123	125/125	111/120	315/323	117/127	125/150	115/124	319/327
		112A	24.0/32.0	66.7/77.0	132/145	150/150	128/140	330/340	136/148	150/150	132/144	334/344
		112A+117A	31.8/42.4	88.4/102.0	159/176	175/200	153/169	440/467	163/180	175/200	157/173	444/471
460-3-60	STD	NONE	—	—	21	25	21	97	22	25	23	99
		116B	13.9	16.7	41	45	41	114	43	45	43	116
		113B	16.5	19.8	45	45	44	117	47	50	46	119
		114B	27.8	33.4	62	70	60	130	64	70	62	132
		115B	33.0	39.7	70	70	67	137	72	80	69	139
		128B	41.7	50.2	83	90	79	147	85	90	81	149
	MED	NONE	—	—	21	25	22	116	23	25	24	118
		116B	13.9	16.7	42	45	42	133	44	45	44	135
		113B	16.5	19.8	46	50	45	136	48	50	47	138
		114B	27.8	33.4	63	70	61	149	65	70	63	151
		115B	33.0	39.7	71	80	68	156	73	80	70	158
		128B	41.7	50.2	84	90	80	166	86	90	82	168
	HIGH	NONE	—	—	23	25	24	131	25	30	27	133
		116B	13.9	16.7	44	45	44	148	46	50	46	150
		113B	16.5	19.8	48	50	47	151	50	50	49	153
		114B	27.8	33.4	65	70	63	164	67	70	65	166
		115B	33.0	39.7	73	80	70	171	75	80	72	173
		128B	41.7	50.2	86	90	82	181	88	90	84	183
575-3-60	STD	NONE	—	—	15	20	15	79	19	20	20	83
		118A	18.0	17.3	36	40	35	96	40	40	40	100
		119A	36.0	34.6	58	60	55	114	62	70	59	118
	MED	NONE	—	—	15	20	16	83	19	20	20	87
		118A	18.0	17.3	37	40	36	100	41	45	40	104
		119A	36.0	34.6	59	60	56	118	62	70	60	122
	HIGH	NONE	—	—	16	20	17	94	20	25	21	98
		118A	18.0	17.3	38	40	37	111	41	45	41	115
		119A	36.0	34.6	59	60	56	129	63	70	61	133

See Legend and Notes on page 58.

Table AP — 50HCQD09 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	46	60	47	236	49	60	52	240
		117A	7.8/10.4	21.7/25.0	73/77	80/80	72/76	258/261	76/81	80/90	77/80	262/265
		110A	12.0/16.0	33.4/38.5	87/94	90/100	86/92	269/275	91/97	100/100	90/96	273/279
		111A	18.6/24.8	51.7/59.7	110/120	110/125	107/116	288/296	114/124	125/125	111/120	292/300
		112A	24.0/32.0	66.7/77.0	129/142	150/150	124/136	303/313	133/146	150/150	128/140	307/317
		112A+117A	31.8/42.4	88.4/102.0	156/173	175/175	149/165	413/440	160/177	175/200	153/169	417/444
	MED	NONE	—	—	49/49	60/60	51/51	278	53/52	60/60	55/55	282
		117A	7.8/10.4	21.7/25.0	76/80	80/80	76/80	300/303	80/84	80/90	80/84	304/307
		110A	12.0/16.0	33.4/38.5	91/97	100/100	89/95	311/317	94/101	100/110	94/99	315/321
		111A	18.6/24.8	51.7/59.7	113/123	125/125	110/119	330/338	117/127	125/150	115/124	334/342
		112A	24.0/32.0	66.7/77.0	132/145	150/150	128/139	345/355	136/149	150/150	132/144	349/359
		112A+117A	31.8/42.4	88.4/102.0	159/176	175/200	153/168	455/482	163/180	175/200	157/173	459/486
	HIGH	NONE	—	—	51	60	53	292	55	60	58	296
		117A	7.8/10.4	21.7/25.0	78/82	80/90	78/82	314/317	82/86	90/90	83/87	318/321
		110A	12.0/16.0	33.4/38.5	93/99	100/100	92/98	325/331	97/103	100/110	96/102	329/335
		111A	18.6/24.8	51.7/59.7	116/126	125/150	113/122	344/352	119/129	125/150	117/127	348/356
		112A	24.0/32.0	66.7/77.0	134/147	150/150	130/142	359/369	138/151	150/175	135/146	363/373
		112A+117A	31.8/42.4	88.4/102.0	161/178	175/200	155/171	469/496	165/182	175/200	160/175	473/500
460-3-60	STD	NONE	—	—	21	25	22	118	23	25	24	120
		116B	13.9	16.7	42	45	41	135	44	45	43	137
		113B	16.5	19.8	46	50	45	138	48	50	47	140
		114B	27.8	33.4	63	70	60	151	65	70	62	153
		115B	33.0	39.7	71	80	67	158	73	80	69	160
		128B	41.7	50.2	84	90	79	168	86	90	82	170
	MED	NONE	—	—	23	25	24	139	25	30	26	141
		116B	13.9	16.7	44	45	43	156	45	45	45	158
		113B	16.5	19.8	47	50	46	159	49	50	48	161
		114B	27.8	33.4	64	70	62	172	66	70	64	174
		115B	33.0	39.7	72	80	69	179	74	80	71	181
		128B	41.7	50.2	85	90	81	189	87	90	83	191
	HIGH	NONE	—	—	24	30	25	146	26	30	27	148
		116B	13.9	16.7	45	45	44	163	46	50	46	165
		113B	16.5	19.8	49	50	48	166	50	50	50	168
		114B	27.8	33.4	66	70	63	179	67	70	65	181
		115B	33.0	39.7	73	80	70	186	75	80	73	188
		128B	41.7	50.2	87	90	83	196	88	90	85	198
575-3-60	STD	NONE	—	—	17	20	17	97	21	25	22	101
		118A	18.0	17.3	38	40	37	114	42	45	41	118
		119A	36.0	34.6	60	60	57	132	64	70	61	136
	MED	NONE	—	—	18	20	18	108	21	25	22	112
		118A	18.0	17.3	39	40	38	125	43	45	42	129
		119A	36.0	34.6	61	70	58	143	65	70	62	147
	HIGH	NONE	—	—	18	20	18	108	21	25	22	112
		118A	18.0	17.3	39	40	38	125	43	45	42	129
		119A	36.0	34.6	61	70	58	143	65	70	62	147

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AP — 50HCQD09 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	50	60	53	241	54	60	57	245
		117A	7.8/10.4	21.7/25.0	77/82	80/90	78/82	263/266	81/85	90/90	82/86	267/270
		110A	12.0/16.0	33.4/38.5	92/98	100/100	91/97	274/280	96/102	100/110	96/101	278/284
		111A	18.6/24.8	51.7/59.7	115/125	125/125	112/121	293/301	119/129	125/150	117/126	297/305
		112A	24.0/32.0	66.7/77.0	134/147	150/150	129/141	308/318	138/150	150/150	134/146	312/322
		112A+117A	31.8/42.4	88.4/102.0	161/178	175/200	154/170	418/445	165/182	175/200	159/174	422/449
	MED	NONE	—	—	54/53	60/60	56/56	283	57/57	70/70	61/61	287
		117A	7.8/10.4	21.7/25.0	81/85	90/90	81/85	305/308	84/89	90/90	86/89	309/312
		110A	12.0/16.0	33.4/38.5	95/102	100/110	95/101	316/322	99/105	100/110	99/105	320/326
		111A	18.6/24.8	51.7/59.7	118/128	125/150	116/125	335/343	122/132	125/150	120/129	339/347
		112A	24.0/32.0	66.7/77.0	137/150	150/150	133/145	350/360	141/154	150/175	138/149	354/364
		112A+117A	31.8/42.4	88.4/102.0	164/181	175/200	158/174	460/487	168/185	175/200	162/178	464/491
	HIGH	NONE	—	—	56	60	59	297	60	70	63	301
		117A	7.8/10.4	21.7/25.0	83/87	90/90	84/88	319/322	87/91	90/100	88/92	323/326
		110A	12.0/16.0	33.4/38.5	98/104	100/110	97/103	330/336	101/108	110/110	102/108	334/340
		111A	18.6/24.8	51.7/59.7	120/130	125/150	118/128	349/357	124/134	125/150	123/132	353/361
		112A	24.0/32.0	66.7/77.0	139/152	150/175	136/148	364/374	143/156	150/175	140/152	368/378
		112A+117A	31.8/42.4	88.4/102.0	166/183	175/200	161/176	474/501	170/187	175/200	165/181	478/505
460-3-60	STD	NONE	—	—	23	25	24	120	25	30	26	122
		116B	13.9	16.7	44	45	43	137	46	50	46	139
		113B	16.5	19.8	48	50	47	140	50	50	49	142
		114B	27.8	33.4	65	70	63	153	67	70	65	155
		115B	33.0	39.7	73	80	70	160	75	80	72	162
		128B	41.7	50.2	86	90	82	170	88	90	84	172
	MED	NONE	—	—	25	30	26	141	27	30	28	143
		116B	13.9	16.7	46	50	45	158	48	50	47	160
		113B	16.5	19.8	50	50	49	161	51	60	51	163
		114B	27.8	33.4	67	70	65	174	68	70	67	176
		115B	33.0	39.7	75	80	72	181	76	80	74	183
		128B	41.7	50.2	88	90	84	191	89	90	86	193
	HIGH	NONE	—	—	26	30	27	148	28	30	29	150
		116B	13.9	16.7	47	50	47	165	49	50	49	167
		113B	16.5	19.8	51	60	50	168	53	60	52	170
		114B	27.8	33.4	68	70	66	181	70	70	68	183
		115B	33.0	39.7	76	80	73	188	77	80	75	190
		128B	41.7	50.2	89	90	85	198	91	100	87	200
575-3-60	STD	NONE	—	—	18	20	19	99	22	25	23	103
		118A	18.0	17.3	40	40	39	116	44	45	43	120
		119A	36.0	34.6	62	70	59	134	66	70	63	138
	MED	NONE	—	—	19	25	20	110	23	25	24	114
		118A	18.0	17.3	41	45	40	127	45	45	44	131
		119A	36.0	34.6	63	70	60	145	66	70	64	149
	HIGH	NONE	—	—	19	25	20	110	23	25	24	114
		118A	18.0	17.3	41	45	40	127	45	45	44	131
		119A	36.0	34.6	63	70	60	145	66	70	64	149

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AQ — 50HCQD12 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Single Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	46	60	47	262	49	60	52	266
		288A	7.5/10.0	20.9/24.1	72/76	80/80	71/75	283/286	76/80	80/80	76/79	287/290
		291A	12.4/16.5	34.4/39.7	89/95	90/100	87/93	296/302	92/99	100/100	91/97	300/306
		294A	25.2/33.5	69.9/80.6	133/146	150/150	128/140	332/343	137/150	150/150	132/144	336/347
		288A+294A	32.7/43.5	90.7/104.7	159/177	175/200	152/168	443/471	163/180	175/200	156/172	447/475
		291A+294A	37.6/50.0	104.3/120.3	176/166	200/175	167/186	471/503	180/170	200/175	172/190	475/507
	MED	NONE	—	—	49/49	60/60	51/51	304	53/53	60/60	55/55	308
		288A	7.5/10.0	20.9/24.1	75/79	80/80	75/79	325/328	79/83	80/90	79/83	329/332
		291A	12.4/16.5	34.4/39.7	92/98	100/100	91/97	338/344	96/102	100/110	95/101	342/348
		294A	25.2/33.5	69.9/80.6	136/149	150/150	131/144	374/385	140/153	150/175	136/148	378/389
		288A+294A	32.7/43.5	90.7/104.7	162/180	175/200	155/171	485/513	166/183	175/200	160/176	489/517
		291A+294A	37.6/50.0	104.3/120.3	179/169	200/175	171/189	513/545	183/173	200/200	175/194	517/549
	HIGH	NONE	—	—	62	80	65	324	66	80	69	328
		288A	7.5/10.0	20.9/24.1	88/92	100/100	89/93	345/348	92/96	100/100	93/97	349/352
		291A	12.4/16.5	34.4/39.7	105/112	110/125	104/111	358/364	109/115	110/125	109/115	362/368
		294A	25.2/33.5	69.9/80.6	149/163	150/175	145/158	394/405	153/167	175/175	150/162	398/409
		288A+294A	32.7/43.5	90.7/104.7	175/193	175/200	169/185	505/533	179/197	200/200	174/190	509/537
		291A+294A	37.6/50.0	104.3/120.3	192/182	200/200	185/203	533/565	196/186	200/200	189/208	537/569
460-3-60	STD	NONE	—	—	23	30	23	125	25	30	26	127
		289A	10.0	12.0	38	40	37	137	40	40	39	139
		292A	16.5	19.9	48	50	46	145	49	50	48	147
		295A	33.5	40.3	73	80	70	165	75	80	72	167
		289A+295A	43.5	52.3	88	90	84	230	90	90	86	232
		292A+295A	50.0	60.2	83	90	93	245	85	90	95	247
	MED	NONE	—	—	24	30	25	146	26	30	27	148
		289A	10.0	12.0	39	40	39	158	41	45	41	160
		292A	16.5	19.9	49	50	48	166	51	60	50	168
		295A	33.5	40.3	75	80	72	186	77	80	74	188
		289A+295A	43.5	52.3	90	90	85	251	92	100	88	253
		292A+295A	50.0	60.2	85	90	95	266	86	90	97	268
	HIGH	NONE	—	—	31	40	32	156	33	40	34	158
		289A	10.0	12.0	46	50	46	168	48	50	48	170
		292A	16.5	19.9	56	60	55	176	58	60	57	178
		295A	33.5	40.3	81	90	79	196	83	90	81	198
		289A+295A	43.5	52.3	96	100	92	261	98	100	94	263
		292A+295A	50.0	60.2	91	100	101	276	93	100	104	278
575-3-60	STD	NONE	—	—	18	20	18	95	21	25	22	99
		290A	10.0	9.6	30	30	29	105	33	35	33	109
		293A	16.5	15.9	37	40	36	111	41	45	41	115
		296A	33.5	32.2	58	60	55	127	62	70	59	131
		290A+296A	43.5	41.9	70	70	66	179	74	80	70	183
		293A+296A	50.0	48.1	66	70	73	191	69	80	78	195
	MED	NONE	—	—	18	20	19	106	22	25	23	110
		290A	10.0	9.6	30	30	30	116	34	35	34	120
		293A	16.5	15.9	38	40	37	122	42	45	42	126
		296A	33.5	32.2	59	60	56	138	62	70	60	142
		290A+296A	43.5	41.9	71	80	67	190	74	80	71	194
		293A+296A	50.0	48.1	66	70	74	202	70	80	79	206
	HIGH	NONE	—	—	25	30	26	118	29	35	30	122
		290A	10.0	9.6	37	40	37	128	41	45	41	132
		293A	16.5	15.9	45	45	44	134	49	50	49	138
		296A	33.5	32.2	66	70	63	150	69	70	67	154
		290A+296A	43.5	41.9	78	80	74	202	81	90	79	206
		293A+296A	50.0	48.1	73	80	81	214	77	80	86	218

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AQ — 50HCQD12 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	50	60	53	267	54	60	57	271
		288A	7.5/10.0	20.9/24.1	77/81	80/90	77/81	288/291	80/84	80/90	81/85	292/295
		291A	12.4/16.5	34.4/39.7	93/100	100/100	92/99	301/307	97/104	100/110	97/103	305/311
		294A	25.2/33.5	69.9/80.6	138/151	150/175	133/146	337/348	142/155	150/175	138/150	341/352
		288A+294A	32.7/43.5	90.7/104.7	164/181	175/200	157/173	448/476	168/185	175/200	162/178	452/480
		291A+294A	37.6/50.0	104.3/120.3	181/171	200/175	173/191	476/508	185/175	200/200	177/196	480/512
	MED	NONE	—	—	54/54	60/60	57/56	309	57/57	70/70	61/61	313
		288A	7.5/10.0	20.9/24.1	80/84	80/90	81/84	330/333	84/87	90/90	85/89	334/337
		291A	12.4/16.5	34.4/39.7	97/103	100/110	96/102	343/349	100/107	100/110	101/106	347/353
		294A	25.2/33.5	69.9/80.6	141/154	150/175	137/149	379/390	145/158	150/175	141/154	383/394
		288A+294A	32.7/43.5	90.7/104.7	167/184	175/200	161/177	490/518	171/188	175/200	165/181	494/522
		291A+294A	37.6/50.0	104.3/120.3	184/174	200/200	177/195	518/550	188/178	200/200	181/199	522/554
	HIGH	NONE	—	—	67	80	70	329	71	80	75	333
		288A	7.5/10.0	20.9/24.1	93/97	100/100	94/98	350/353	97/101	100/110	99/102	354/357
		291A	12.4/16.5	34.4/39.7	110/116	110/125	110/116	363/369	114/120	125/125	114/120	367/373
		294A	25.2/33.5	69.9/80.6	154/168	175/175	151/163	399/410	158/171	175/175	155/167	403/414
		288A+294A	32.7/43.5	90.7/104.7	180/198	200/200	175/191	510/538	184/201	200/225	179/195	514/542
		291A+294A	37.6/50.0	104.3/120.3	197/187	200/200	190/209	538/570	201/191	225/200	195/213	542/574
460-3-60	STD	NONE	—	—	25	30	26	127	27	30	28	129
		289A	10.0	12.0	40	40	40	139	42	45	42	141
		292A	16.5	19.9	50	50	49	147	52	60	51	149
		295A	33.5	40.3	75	80	72	167	77	80	74	169
		289A+295A	43.5	52.3	90	90	86	232	92	100	88	234
		292A+295A	50.0	60.2	85	90	95	247	87	90	97	249
	MED	NONE	—	—	27	30	28	148	28	30	30	150
		289A	10.0	12.0	42	45	42	160	43	45	44	162
		292A	16.5	19.9	51	60	51	168	53	60	53	170
		295A	33.5	40.3	77	80	74	188	79	80	76	190
		289A+295A	43.5	52.3	92	100	88	253	94	100	90	255
		292A+295A	50.0	60.2	87	90	97	268	89	100	99	270
	HIGH	NONE	—	—	33	40	35	158	35	40	37	160
		289A	10.0	12.0	48	50	49	170	50	50	51	172
		292A	16.5	19.9	58	60	58	178	60	60	60	180
		295A	33.5	40.3	84	90	81	198	85	90	83	200
		289A+295A	43.5	52.3	99	100	95	263	100	100	97	265
		292A+295A	50.0	60.2	93	100	104	278	95	100	106	280

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AQ — S50HCQD12 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Single Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR	DISC. SIZE	
							FLA	LRA			FLA	LRA
575-3-60	STD	NONE	—	—	19	25	20	97	23	25	24	101
		290A	10.0	9.6	31	35	31	107	35	35	35	111
		293A	16.5	15.9	39	40	38	113	43	45	43	117
		296A	33.5	32.2	59	60	57	129	63	70	61	133
		290A+296A	43.5	41.9	72	80	68	181	75	80	72	185
		293A+296A	50.0	48.1	67	70	75	193	71	80	80	197
	MED	NONE	—	—	20	25	21	108	24	25	25	112
		290A	10.0	9.6	32	35	32	118	36	40	36	122
		293A	16.5	15.9	40	40	39	124	44	45	43	128
		296A	33.5	32.2	60	60	58	140	64	70	62	144
		290A+296A	43.5	41.9	72	80	69	192	76	80	73	196
		293A+296A	50.0	48.1	68	70	76	204	72	80	81	208
	HIGH	NONE	—	—	27	30	28	120	31	35	32	124
		290A	10.0	9.6	39	45	39	130	43	45	43	134
		293A	16.5	15.9	47	50	46	136	51	60	51	140
		296A	33.5	32.2	67	70	65	152	71	80	69	156
		290A+296A	43.5	41.9	79	80	76	204	83	90	81	208
		293A+296A	50.0	48.1	75	80	83	216	79	90	88	220

See Legend and Notes on page 58.

Table AR — 50HCQD07 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Two Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	33/33	50/50	32/32	165	37/36	50/50	36/36	169
		264A	4.9/6.5	13.6/15.6	50/52	60/60	47/50	179/181	54/56	60/60	52/54	183/185
		117A	7.8/10.4	21.7/25.0	60/64	60/70	57/60	187/190	64/68	70/70	61/65	191/194
		110A	12.0/16.0	33.4/38.5	75/81	80/90	70/76	198/204	78/85	80/90	75/80	202/208
		117A+117A	15.8/21.0	43.8/50.5	88/96	90/100	82/90	253/266	91/100	100/100	87/94	257/270
		110A+117A	19.9/26.5	55.2/63.8	102/112	110/125	95/105	275/293	106/116	110/125	100/109	279/297
	MED	NONE	—	—	36/35	50/50	35/34	195	39/39	50/50	39/39	199
		264A	4.9/6.5	13.6/15.6	53/54	60/60	51/52	209/211	56/58	60/60	55/56	213/215
		117A	7.8/10.4	21.7/25.0	63/66	70/70	60/63	217/220	67/70	70/80	64/67	221/224
		110A	12.0/16.0	33.4/38.5	77/83	80/90	73/78	228/234	81/87	90/90	78/83	232/238
		117A+117A	15.8/21.0	43.8/50.5	90/98	90/100	85/92	283/296	94/102	100/110	90/97	287/300
		110A+117A	19.9/26.5	55.2/63.8	105/115	110/125	99/108	305/323	108/118	110/125	103/112	309/327
	HIGH	NONE	—	—	41/40	50/50	41/40	230	44/44	60/60	45/44	234
		264A	4.9/6.5	13.6/15.6	58/59	60/60	56/58	244/246	61/63	70/70	61/62	248/250
		117A	7.8/10.4	21.7/25.0	68/71	80/80	66/69	252/255	72/75	80/80	70/73	256/259
		110A	12.0/16.0	33.4/38.5	82/88	90/90	79/84	263/269	86/92	90/100	84/88	267/273
		117A+117A	15.8/21.0	43.8/50.5	95/103	100/110	91/98	318/331	99/107	100/110	96/102	322/335
		110A+117A	19.9/26.5	55.2/63.8	110/120	110/125	104/113	340/358	113/123	125/125	109/118	344/362
460-3-60	STD	NONE	—	—	17	25	16	81	19	25	18	83
		265A	6.0	7.2	26	30	25	88	28	30	27	90
		266A	11.5	13.8	34	40	32	95	36	40	34	97
		267A	14.0	16.8	38	40	36	98	40	40	38	100
		268A	23.0	27.7	52	60	48	109	54	60	50	111
		269A	25.5	30.7	55	60	52	112	57	60	54	114
	MED	NONE	—	—	18	25	17	97	20	25	19	99
		265A	6.0	7.2	27	30	26	104	29	30	28	106
		266A	11.5	13.8	35	40	33	111	37	40	35	113
		267A	14.0	16.8	39	40	37	114	41	45	39	116
		268A	23.0	27.7	53	60	49	125	54	60	51	127
		269A	25.5	30.7	56	60	53	128	58	60	55	130
	HIGH	NONE	—	—	21	25	20	114	22	30	22	116
		265A	6.0	7.2	30	30	29	121	31	35	31	123
		266A	11.5	13.8	38	40	36	128	40	45	38	130
		267A	14.0	16.8	42	45	40	131	43	45	42	133
		268A	23.0	27.7	55	60	52	142	57	60	54	144
		269A	25.5	30.7	59	60	56	145	61	70	58	147
575-3-60	STD	NONE	—	—	14	20	13	68	18	25	18	72
		118A	18.0	17.3	36	40	33	85	40	40	38	89
		299A	28.0	26.9	48	50	44	95	52	60	49	99
	MED	NONE	—	—	16	20	15	81	20	25	20	85
		118A	18.0	17.3	37	40	35	98	41	45	40	102
		299A	28.0	26.9	49	50	46	108	53	60	51	112
	HIGH	NONE	—	—	17	20	17	95	21	25	22	99
		118A	18.0	17.3	39	40	37	112	43	45	42	116
		299A	28.0	26.9	51	60	48	122	55	60	53	126

See Legend and Notes on page 58.

Table AR — 50HCQD07 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Two Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	38/37	50/50	37/37	170	41/41	50/50	42/42	174
		264A	4.9/6.5	13.6/15.6	55/57	60/60	53/55	184/186	58/61	60/70	57/59	188/190
		117A	7.8/10.4	21.7/25.0	65/69	70/80	62/66	192/195	69/73	80/80	67/70	196/199
		110A	12.0/16.0	33.4/38.5	79/86	80/90	76/81	203/209	83/89	90/90	80/86	207/213
		117A+117A	15.8/21.0	43.8/50.5	92/101	100/110	88/95	258/271	96/104	100/110	92/100	262/275
		110A+117A	19.9/26.5	55.2/63.8	107/117	110/125	101/111	280/298	110/121	125/125	105/115	284/302
	MED	NONE	—	—	40/40	50/50	41/40	200	44/43	60/60	45/44	204
		264A	4.9/6.5	13.6/15.6	57/59	60/60	56/58	214/216	61/63	70/70	61/62	218/220
		117A	7.8/10.4	21.7/25.0	68/71	80/80	66/68	222/225	71/75	80/80	70/73	226/229
		110A	12.0/16.0	33.4/38.5	82/88	90/90	79/84	233/239	86/92	90/100	83/88	237/243
		117A+117A	15.8/21.0	43.8/50.5	95/103	100/110	91/98	288/301	99/107	100/110	95/102	292/305
		110A+117A	19.9/26.5	55.2/63.8	109/119	110/125	104/113	310/328	113/123	125/125	108/117	314/332
	HIGH	NONE	—	—	45/45	60/60	46/45	235	49/48	60/60	51/50	239
		264A	4.9/6.5	13.6/15.6	62/64	70/70	62/63	249/251	66/68	80/80	66/68	253/255
		117A	7.8/10.4	21.7/25.0	73/76	80/80	71/74	257/260	76/80	80/80	76/78	261/264
		110A	12.0/16.0	33.4/38.5	87/93	90/100	85/90	268/274	91/97	100/100	89/94	272/278
		117A+117A	15.8/21.0	43.8/50.5	100/108	100/110	97/103	323/336	104/112	110/125	101/108	327/340
		110A+117A	19.9/26.5	55.2/63.8	114/124	125/125	110/119	345/363	118/128	125/150	114/123	349/367
460-3-60	STD	NONE	—	—	19	25	19	83	21	30	21	85
		265A	6.0	7.2	28	30	27	90	30	35	29	92
		266A	11.5	13.8	37	40	35	97	38	40	37	99
		267A	14.0	16.8	40	45	38	100	42	45	40	102
		268A	23.0	27.7	54	60	51	111	56	60	53	113
		269A	25.5	30.7	58	60	54	114	59	60	56	116
	MED	NONE	—	—	20	25	20	99	22	30	22	101
		265A	6.0	7.2	29	30	28	106	31	35	30	108
		266A	11.5	13.8	37	40	36	113	39	45	38	115
		267A	14.0	16.8	41	45	39	116	43	45	41	118
		268A	23.0	27.7	55	60	52	127	57	60	54	129
		269A	25.5	30.7	59	60	55	130	60	60	57	132
	HIGH	NONE	—	—	23	30	23	116	25	30	25	118
		265A	6.0	7.2	32	35	31	123	34	40	33	125
		266A	11.5	13.8	40	45	39	130	42	45	41	132
		267A	14.0	16.8	44	45	42	133	46	50	44	135
		268A	23.0	27.7	57	60	55	144	59	60	57	146
		269A	25.5	30.7	61	70	58	147	63	70	60	149
575-3-60	STD	NONE	—	—	16	20	15	70	20	25	20	74
		118A	18.0	17.3	37	40	35	87	41	45	40	91
		299A	28.0	26.9	49	50	46	97	53	60	51	101
	MED	NONE	—	—	17	20	17	83	21	25	22	87
		118A	18.0	17.3	39	40	37	100	43	45	42	104
		299A	28.0	26.9	51	60	48	110	55	60	53	114
	HIGH	NONE	—	—	19	25	19	97	23	30	24	101
		118A	18.0	17.3	41	45	39	114	45	45	44	118
		299A	28.0	26.9	53	60	50	124	57	60	55	128

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AS — 50HCQD08 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Two Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	39/39	50/50	40/40	195	43/42	50/50	45/44	199
		117A	7.8/10.4	21.7/25.0	66/70	70/70	65/69	217/220	70/74	70/80	70/73	221/224
		110A	12.0/16.0	33.4/38.5	80/87	90/90	79/84	228/234	84/90	90/90	83/89	232/238
		111A	18.6/24.8	51.7/59.7	103/113	110/125	100/109	247/255	107/117	110/125	104/113	251/259
		112A	24.0/32.0	66.7/77.0	122/135	125/150	117/129	262/272	126/139	150/150	121/133	266/276
		112A+117A	31.8/42.4	88.4/102.0	149/166	150/175	142/157	372/399	153/170	175/175	146/162	376/403
	MED	NONE	—	—	40/40	50/50	42/41	199	44/44	50/50	46/46	203
		117A	7.8/10.4	21.7/25.0	67/71	70/80	67/70	221/224	71/75	80/80	71/75	225/228
		110A	12.0/16.0	33.4/38.5	82/88	90/90	80/86	232/238	86/92	90/100	85/90	236/242
		111A	18.6/24.8	51.7/59.7	105/114	110/125	101/110	251/259	108/118	110/125	106/114	255/263
		112A	24.0/32.0	66.7/77.0	123/136	125/150	118/130	266/276	127/140	150/150	123/134	270/280
		112A+117A	31.8/42.4	88.4/102.0	151/167	175/175	143/159	376/403	154/171	175/175	148/163	380/407
	HIGH	NONE	—	—	44/43	50/50	46/45	249	48/47	60/50	50/49	253
		117A	7.8/10.4	21.7/25.0	71/74	80/80	71/74	271/274	75/78	80/80	75/78	275/278
		110A	12.0/16.0	33.4/38.5	85/91	90/100	84/89	282/288	89/95	90/100	89/93	286/292
		111A	18.6/24.8	51.7/59.7	108/117	110/125	105/114	301/309	112/121	125/125	110/118	305/313
		112A	24.0/32.0	66.7/77.0	127/139	150/150	123/133	316/326	131/143	150/150	127/138	320/330
		112A+117A	31.8/42.4	88.4/102.0	154/170	175/175	148/162	426/453	158/174	175/175	152/167	430/457
460-3-60	STD	NONE	—	—	19	20	19	97	20	25	21	99
		116B	13.9	16.7	40	40	38	114	41	45	40	116
		113B	16.5	19.8	43	45	42	117	45	45	44	119
		114B	27.8	33.4	60	60	58	130	62	70	60	132
		115B	33.0	39.7	68	70	65	137	70	70	67	139
		128B	41.7	50.2	81	90	77	147	83	90	79	149
	MED	NONE	—	—	19	25	20	100	21	25	22	102
		116B	13.9	16.7	40	40	39	117	42	45	41	119
		113B	16.5	19.8	44	45	43	120	46	50	45	122
		114B	27.8	33.4	61	70	58	133	63	70	60	135
		115B	33.0	39.7	69	70	65	140	71	80	68	142
		128B	41.7	50.2	82	90	78	150	84	90	80	152
	HIGH	NONE	—	—	21	25	22	125	22	25	24	127
		116B	13.9	16.7	42	45	41	142	43	45	43	144
		113B	16.5	19.8	45	45	44	145	47	50	46	147
		114B	27.8	33.4	62	70	60	158	64	70	62	160
		115B	33.0	39.7	70	70	67	165	72	80	69	167
		128B	41.7	50.2	83	90	79	175	85	90	81	177
575-3-60	STD	NONE	—	—	14	20	15	79	18	20	19	83
		118A	18.0	17.3	36	40	35	96	40	40	39	100
		119A	36.0	34.6	58	60	55	114	61	70	59	118
	MED	NONE	—	—	15	20	16	83	19	20	20	87
		118A	18.0	17.3	37	40	35	100	40	45	40	104
		119A	36.0	34.6	58	60	55	118	62	70	60	122
	HIGH	NONE	—	—	16	20	17	92	20	25	21	96
		118A	18.0	17.3	38	40	37	109	42	45	41	113
		119A	36.0	34.6	59	60	56	127	63	70	61	131

See Legend and Notes on page 58.

Table AS — 50HCQD08 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Two Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	44/43	50/50	46/46	200	47/47	60/50	50/50	204
		117A	7.8/10.4	21.7/25.0	71/75	80/80	71/74	222/225	74/78	80/80	75/79	226/229
		110A	12.0/16.0	33.4/38.5	85/91	90/100	84/90	233/239	89/95	90/100	89/94	237/243
		111A	18.6/24.8	51.7/59.7	108/118	110/125	105/114	252/260	112/122	125/125	110/119	256/264
		112A	24.0/32.0	66.7/77.0	127/140	150/150	122/134	267/277	131/143	150/150	127/138	271/281
		112A+117A	31.8/42.4	88.4/102.0	154/171	175/175	147/163	377/404	158/175	175/175	152/167	381/408
	MED	NONE	—	—	45/45	50/50	47/47	204	49/48	60/60	52/51	208
		117A	7.8/10.4	21.7/25.0	72/76	80/80	72/76	226/229	76/80	80/80	77/80	230/233
		110A	12.0/16.0	33.4/38.5	87/93	90/100	86/91	237/243	90/96	90/100	90/96	241/247
		111A	18.6/24.8	51.7/59.7	109/119	110/125	107/116	256/264	113/123	125/125	111/120	260/268
		112A	24.0/32.0	66.7/77.0	128/141	150/150	124/135	271/281	132/145	150/150	128/140	275/285
		112A+117A	31.8/42.4	88.4/102.0	155/172	175/175	149/164	381/408	159/176	175/200	153/169	385/412
	HIGH	NONE	—	—	49/48	60/60	52/50	254	52/51	60/60	56/55	258
		117A	7.8/10.4	21.7/25.0	76/79	80/80	76/79	276/279	79/83	80/90	81/83	280/283
		110A	12.0/16.0	33.4/38.5	90/96	90/100	90/95	287/293	94/99	100/100	94/99	291/297
		111A	18.6/24.8	51.7/59.7	113/122	125/125	111/119	306/314	117/126	125/150	115/123	310/318
		112A	24.0/32.0	66.7/77.0	132/144	150/150	128/139	321/331	136/148	150/150	133/143	325/335
		112A+117A	31.8/42.4	88.4/102.0	159/175	175/175	153/168	431/458	163/179	175/200	158/172	435/462
460-3-60	STD	NONE	—	—	21	25	22	99	23	25	24	101
		116B	13.9	16.7	42	45	41	116	44	45	43	118
		113B	16.5	19.8	46	50	45	119	47	50	47	121
		114B	27.8	33.4	63	70	60	132	64	70	62	134
		115B	33.0	39.7	71	80	67	139	72	80	69	141
		128B	41.7	50.2	84	90	79	149	85	90	82	151
	MED	NONE	—	—	21	25	22	102	23	25	24	104
		116B	13.9	16.7	42	45	42	119	44	45	44	121
		113B	16.5	19.8	46	50	45	122	48	50	47	124
		114B	27.8	33.4	63	70	61	135	65	70	63	137
		115B	33.0	39.7	71	80	68	142	73	80	70	144
		128B	41.7	50.2	84	90	80	152	86	90	82	154
	HIGH	NONE	—	—	23	25	24	127	25	30	26	129
		116B	13.9	16.7	44	45	43	144	46	50	45	146
		113B	16.5	19.8	48	50	47	147	49	50	49	149
		114B	27.8	33.4	65	70	62	160	66	70	65	162
		115B	33.0	39.7	73	80	70	167	74	80	72	169
		128B	41.7	50.2	86	90	82	177	87	90	84	179
575-3-60	STD	NONE	—	—	16	20	17	81	20	25	21	85
		118A	18.0	17.3	38	40	37	98	41	45	41	102
		119A	36.0	34.6	59	60	56	116	63	70	61	120
	MED	NONE	—	—	17	20	17	85	21	25	22	89
		118A	18.0	17.3	38	40	37	102	42	45	42	106
		119A	36.0	34.6	60	60	57	120	64	70	62	124
	HIGH	NONE	—	—	18	20	19	94	22	25	23	98
		118A	18.0	17.3	39	40	39	111	43	45	43	115
		119A	36.0	34.6	61	70	58	129	65	70	63	133

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AT — 50HCQD09 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Two Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	47/47	60/60	49/49	233	51/51	60/60	54/53	237
		117A	7.8/10.4	21.7/25.0	75/78	80/80	74/78	255/258	78/82	80/90	79/82	259/262
		110A	12.0/16.0	33.4/38.5	89/95	90/100	88/93	266/272	93/99	100/100	92/98	270/276
		111A	18.6/24.8	51.7/59.7	112/122	125/125	109/118	285/293	116/126	125/150	113/122	289/297
		112A	24.0/32.0	66.7/77.0	131/143	150/150	126/138	300/310	135/147	150/150	131/142	304/314
		112A+117A	31.8/42.4	88.4/102.0	158/175	175/175	151/166	410/437	162/178	175/200	155/171	414/441
	MED	NONE	—	—	49/48	60/60	51/50	259	53/52	60/60	56/55	263
		117A	7.8/10.4	21.7/25.0	76/79	80/80	76/79	281/284	80/83	80/90	81/83	285/288
		110A	12.0/16.0	33.4/38.5	91/96	100/100	90/95	292/298	95/100	100/100	94/99	296/302
		111A	18.6/24.8	51.7/59.7	114/123	125/125	111/119	311/319	117/127	125/150	115/123	315/323
		112A	24.0/32.0	66.7/77.0	132/144	150/150	128/139	326/336	136/148	150/150	132/143	330/340
		112A+117A	31.8/42.4	88.4/102.0	159/176	175/200	153/168	436/463	163/179	175/200	157/172	440/467
	HIGH	NONE	—	—	51/50	60/60	54/53	283	55/54	60/60	58/57	287
		117A	7.8/10.4	21.7/25.0	78/81	80/90	79/81	305/308	82/85	90/90	83/86	309/312
		110A	12.0/16.0	33.4/38.5	93/98	100/100	92/97	316/322	97/102	100/110	96/101	320/326
		111A	18.6/24.8	51.7/59.7	116/125	125/125	113/121	335/343	120/129	125/150	118/126	339/347
		112A	24.0/32.0	66.7/77.0	135/146	150/150	130/141	350/360	138/150	150/150	135/145	354/364
		112A+117A	31.8/42.4	88.4/102.0	162/178	175/200	155/170	460/487	165/181	175/200	160/174	464/491
460-3-60	STD	NONE	—	—	22	25	23	117	24	30	25	119
		116B	13.9	16.7	43	45	42	134	45	45	44	136
		113B	16.5	19.8	47	50	45	137	48	50	47	139
		114B	27.8	33.4	64	70	61	150	65	70	63	152
		115B	33.0	39.7	72	80	68	157	73	80	70	159
		128B	41.7	50.2	85	90	80	167	86	90	82	169
	MED	NONE	—	—	22	25	23	130	24	30	25	132
		116B	13.9	16.7	43	45	42	147	45	45	44	149
		113B	16.5	19.8	47	50	46	150	49	50	48	152
		114B	27.8	33.4	64	70	62	163	66	70	64	165
		115B	33.0	39.7	72	80	69	170	74	80	71	172
		128B	41.7	50.2	85	90	81	180	87	90	83	182
	HIGH	NONE	—	—	23	25	24	142	25	30	26	144
		116B	13.9	16.7	44	45	44	159	46	50	46	161
		113B	16.5	19.8	48	50	47	162	50	50	49	164
		114B	27.8	33.4	65	70	63	175	67	70	65	177
		115B	33.0	39.7	73	80	70	182	75	80	72	184
		128B	41.7	50.2	86	90	82	192	88	90	84	194
575-3-60	STD	NONE	—	—	18	20	19	99	22	25	23	103
		118A	18.0	17.3	40	40	39	116	44	45	43	120
		119A	36.0	34.6	62	70	59	134	65	70	63	138
	MED	NONE	—	—	19	25	20	108	23	25	24	112
		118A	18.0	17.3	41	45	40	125	45	45	44	129
		119A	36.0	34.6	63	70	60	143	66	70	64	147
	HIGH	NONE	—	—	19	25	20	108	23	25	24	112
		118A	18.0	17.3	41	45	40	125	45	45	44	129
		119A	36.0	34.6	63	70	60	143	66	70	64	147

See Legend and Notes on page 58.

Table AT — 50HCQD09 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Two Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	52/52	60/60	55/55	238	56/56	60/60	59/59	242
		117A	7.8/10.4	21.7/25.0	79/83	80/90	80/83	260/263	83/87	90/90	84/88	264/267
		110A	12.0/16.0	33.4/38.5	94/100	100/100	93/99	271/277	98/104	100/110	98/103	275/281
		111A	18.6/24.8	51.7/59.7	117/127	125/150	114/123	290/298	121/130	125/150	119/128	294/302
		112A	24.0/32.0	66.7/77.0	136/148	150/150	132/143	305/315	139/152	150/175	136/148	309/319
		112A+117A	31.8/42.4	88.4/102.0	163/179	175/200	157/172	415/442	167/183	175/200	161/176	419/446
	MED	NONE	—	—	54/53	60/60	57/56	264	58/57	70/70	61/60	268
		117A	7.8/10.4	21.7/25.0	81/84	90/90	82/85	286/289	85/88	90/90	86/89	290/293
		110A	12.0/16.0	33.4/38.5	96/101	100/110	95/100	297/303	99/105	100/110	99/104	301/307
		111A	18.6/24.8	51.7/59.7	118/128	125/150	116/124	316/324	122/131	125/150	121/129	320/328
		112A	24.0/32.0	66.7/77.0	137/149	150/150	133/144	331/341	141/153	150/175	138/149	335/345
		112A+117A	31.8/42.4	88.4/102.0	164/180	175/200	158/173	441/468	168/184	175/200	163/177	445/472
	HIGH	NONE	—	—	56/55	60/60	59/58	288	60/59	70/70	64/62	292
		117A	7.8/10.4	21.7/25.0	83/86	90/90	84/87	310/313	87/90	90/90	89/91	314/317
		110A	12.0/16.0	33.4/38.5	98/103	100/110	98/102	321/327	102/107	110/110	102/107	325/331
		111A	18.6/24.8	51.7/59.7	121/130	125/150	119/127	340/348	124/133	125/150	123/131	344/352
		112A	24.0/32.0	66.7/77.0	139/151	150/175	136/147	355/365	143/155	150/175	140/151	359/369
		112A+117A	31.8/42.4	88.4/102.0	166/182	175/200	161/175	465/492	170/186	175/200	165/180	469/496
460-3-60	STD	NONE	—	—	24	30	25	119	26	30	27	121
		116B	13.9	16.7	45	45	44	136	47	50	46	138
		113B	16.5	19.8	49	50	48	139	51	60	50	141
		114B	27.8	33.4	66	70	64	152	68	70	66	154
		115B	33.0	39.7	74	80	71	159	76	80	73	161
		128B	41.7	50.2	87	90	83	169	89	90	85	171
	MED	NONE	—	—	25	30	26	132	26	30	28	134
		116B	13.9	16.7	45	45	45	149	47	50	47	151
		113B	16.5	19.8	49	50	48	152	51	60	50	154
		114B	27.8	33.4	66	70	64	165	68	70	66	167
		115B	33.0	39.7	74	80	71	172	76	80	73	174
		128B	41.7	50.2	87	90	83	182	89	90	85	184
	HIGH	NONE	—	—	26	30	27	144	27	30	29	146
		116B	13.9	16.7	46	50	46	161	48	50	48	163
		113B	16.5	19.8	50	50	50	164	52	60	52	166
		114B	27.8	33.4	67	70	65	177	69	70	67	179
		115B	33.0	39.7	75	80	73	184	77	80	75	186
		128B	41.7	50.2	88	90	85	194	90	90	87	196
575-3-60	STD	NONE	—	—	20	25	21	101	24	25	25	105
		118A	18.0	17.3	42	45	41	118	45	45	45	122
		119A	36.0	34.6	63	70	61	136	67	70	65	140
	MED	NONE	—	—	21	25	22	110	25	30	26	114
		118A	18.0	17.3	43	45	42	127	46	50	46	131
		119A	36.0	34.6	64	70	62	145	68	70	66	149
	HIGH	NONE	—	—	21	25	22	110	25	30	26	114
		118A	18.0	17.3	43	45	42	127	46	50	46	131
		119A	36.0	34.6	64	70	62	145	68	70	66	149

See Legend and Notes on page 58.

APPENDIX D — ELECTRICAL INFORMATION (cont)

Table AU — 50HCQD12 Unit Wire/Fuse or HACR Breaker Sizing Data
Two Stage Cooling with Two Speed Indoor Fan Motor

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			NO C.O. or UNPWR C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	48/47	60/60	50/49	259	51/51	60/60	54/54	263
		288A	7.5/10.0	20.9/24.1	74/77	80/80	74/77	280/283	77/81	80/90	78/81	284/287
		291A	12.4/16.5	34.4/39.7	91/97	100/100	89/95	293/299	94/101	100/110	93/99	297/303
		294A	25.2/33.5	69.9/80.6	135/148	150/150	130/142	329/340	139/152	150/175	134/146	333/344
		288A+294A	32.7/43.5	90.7/104.7	161/178	175/200	154/170	440/468	165/182	175/200	158/174	444/472
		291A+294A	37.6/50.0	104.3/120.3	178/168	200/175	170/188	468/500	182/171	200/175	174/192	472/504
	MED	NONE	—	—	49/48	60/60	51/50	285	53/52	60/60	56/55	289
		288A	7.5/10.0	20.9/24.1	75/78	80/80	75/78	306/309	79/82	80/90	80/82	310/313
		291A	12.4/16.5	34.4/39.7	92/98	100/100	91/96	319/325	96/102	100/110	95/100	323/329
		294A	25.2/33.5	69.9/80.6	136/149	150/150	132/143	355/366	140/153	150/175	136/147	359/370
		288A+294A	32.7/43.5	90.7/104.7	162/179	175/200	156/171	466/494	166/183	175/200	160/175	470/498
		291A+294A	37.6/50.0	104.3/120.3	179/169	200/175	171/189	494/526	183/172	200/200	176/193	498/530
	HIGH	NONE	—	—	62	80	65	324	66	80	69	328
		288A	7.5/10.0	20.9/24.1	88/92	100/100	89/93	345/348	92/96	100/100	93/97	349/352
		291A	12.4/16.5	34.4/39.7	105/112	110/125	104/111	358/364	109/115	110/125	109/115	362/368
		294A	25.2/33.5	69.9/80.6	149/163	150/175	145/158	394/405	153/167	175/175	150/162	398/409
		288A+294A	32.7/43.5	90.7/104.7	175/193	175/200	169/185	505/533	179/197	200/200	174/190	509/537
		291A+294A	37.6/50.0	104.3/120.3	192/182	200/200	185/203	533/565	196/186	200/200	189/208	537/569
460-3-60	STD	NONE	—	—	24	30	24	124	25	30	26	126
		289A	10.0	12.0	39	40	38	136	40	40	40	138
		292A	16.5	19.9	48	50	47	144	50	50	49	146
		295A	33.5	40.3	74	80	71	164	76	80	73	166
		289A+295A	43.5	52.3	89	90	85	229	91	100	87	231
		292A+295A	50.0	60.2	84	90	94	244	86	90	96	246
	MED	NONE	—	—	24	30	25	137	26	30	27	139
		289A	10.0	12.0	39	40	39	149	41	45	41	151
		292A	16.5	19.9	49	50	48	157	51	60	50	159
		295A	33.5	40.3	74	80	71	177	76	80	73	179
		289A+295A	43.5	52.3	89	90	85	242	91	100	87	244
		292A+295A	50.0	60.2	84	90	94	257	86	90	96	259
	HIGH	NONE	—	—	31	40	32	156	33	40	34	158
		289A	10.0	12.0	46	50	46	168	48	50	48	170
		292A	16.5	19.9	56	60	55	176	58	60	57	178
		295A	33.5	40.3	81	90	79	196	83	90	81	198
		289A+295A	43.5	52.3	96	100	92	261	98	100	94	263
		292A+295A	50.0	60.2	91	100	101	276	93	100	104	278
575-3-60	LOW	NONE	—	—	19	25	20	97	23	25	24	101
		290A	10.0	9.6	31	35	31	107	35	35	35	111
		293A	16.5	15.9	39	40	38	113	43	45	42	117
		296A	33.5	32.2	59	60	57	129	63	70	61	133
		290A+296A	43.5	41.9	71	80	68	181	75	80	72	185
		293A+296A	50.0	48.1	67	70	75	193	71	80	79	197
	MED	NONE	—	—	20	25	21	106	24	25	25	110
		290A	10.0	9.6	32	35	32	116	36	40	36	120
		293A	16.5	15.9	40	40	39	122	44	45	43	126
		296A	33.5	32.2	60	60	58	138	64	70	62	142
		290A+296A	43.5	41.9	72	80	69	190	76	80	73	194
		293A+296A	50.0	48.1	68	70	76	202	72	80	81	206
	HIGH	NONE	—	—	25	30	26	118	29	35	30	122
		290A	10.0	9.6	37	40	37	128	41	45	41	132
		293A	16.5	15.9	45	45	44	134	49	50	49	138
		296A	33.5	32.2	66	70	63	150	69	70	67	154
		290A+296A	43.5	41.9	78	80	74	202	81	90	79	206
		293A+296A	50.0	48.1	73	80	81	214	77	80	86	218

See Legend and Notes on page 58.

Table AU — 50HCQD12 Unit Wire/Fuse or HACR Breaker Sizing Data Two Stage Cooling with Two Speed Indoor Fan Motor (cont)

NOM. V-Ph-Hz	IFM TYPE	ELEC. HTR			WITH PWRD C.O.							
					NO P.E.				WITH P.E. (pwrd fr/ unit)			
		CRHEATER ****00	Nom (kW)	FLA	MCA	MAX FUSE OR HACR	DISC. SIZE		MCA	MAX FUSE OR HACR BRKR	DISC. SIZE	
							FLA	LRA			FLA	LRA
208/230-3-60	STD	NONE	—	—	52/52	60/60	55/55	264	56/56	60/60	59/59	268
		288A	7.5/10.0	20.9/24.1	78/82	80/90	79/82	285/288	82/86	90/90	83/87	289/292
		291A	12.4/16.5	34.4/39.7	95/102	100/110	95/100	298/304	99/105	100/110	99/105	302/308
		294A	25.2/33.5	69.9/80.6	140/153	150/175	135/147	334/345	144/157	150/175	140/152	338/349
		288A+294A	32.7/43.5	90.7/104.7	166/183	175/200	159/175	445/473	170/187	175/200	164/180	449/477
		291A+294A	37.6/50.0	104.3/120.3	183/172	200/200	175/193	473/505	187/176	200/200	179/197	477/509
	MED	NONE	—	—	54/53	60/60	57/56	290	58/57	70/70	61/60	294
		288A	7.5/10.0	20.9/24.1	80/83	80/90	81/84	311/314	84/87	90/90	85/88	315/318
		291A	12.4/16.5	34.4/39.7	97/103	100/110	96/102	324/330	101/106	110/110	101/106	328/334
		294A	25.2/33.5	69.9/80.6	141/154	150/175	137/149	360/371	145/158	150/175	142/153	364/375
		288A+294A	32.7/43.5	90.7/104.7	167/184	175/200	161/176	471/499	171/188	175/200	165/181	475/503
		291A+294A	37.6/50.0	104.3/120.3	184/173	200/200	177/194	499/531	188/177	200/200	181/199	503/535
	HIGH	NONE	—	—	67	80	70	329	71	80	75	333
		288A	7.5/10.0	20.9/24.1	93/97	100/100	94/98	350/353	97/101	100/110	99/102	354/357
		291A	12.4/16.5	34.4/39.7	110/116	110/125	110/116	363/369	114/120	125/125	114/120	367/373
		294A	25.2/33.5	69.9/80.6	154/168	175/175	151/163	399/410	158/171	175/175	155/167	403/414
		288A+294A	32.7/43.5	90.7/104.7	180/198	200/200	175/191	510/538	184/201	200/225	179/195	514/542
		291A+294A	37.6/50.0	104.3/120.3	197/187	200/200	190/209	538/570	201/191	225/200	195/213	542/574
460-3-60	STD	NONE	—	—	26	30	27	126	28	30	29	128
		289A	10.0	12.0	41	45	41	138	43	45	43	140
		292A	16.5	19.9	51	60	50	146	52	60	52	148
		295A	33.5	40.3	76	80	73	166	78	80	75	168
		289A+295A	43.5	52.3	91	100	87	231	93	100	89	233
		292A+295A	50.0	60.2	86	90	96	246	88	90	98	248
	MED	NONE	—	—	26	30	27	139	28	30	29	141
		289A	10.0	12.0	41	45	41	151	43	45	43	153
		292A	16.5	19.9	51	60	50	159	53	60	52	161
		295A	33.5	40.3	77	80	74	179	78	80	76	181
		289A+295A	43.5	52.3	92	100	88	244	93	100	90	246
		292A+295A	50.0	60.2	86	90	97	259	88	90	99	261
	HIGH	NONE	—	—	33	40	35	158	35	40	37	160
		289A	10.0	12.0	48	50	49	170	50	50	51	172
		292A	16.5	19.9	58	60	58	178	60	60	60	180
		295A	33.5	40.3	84	90	81	198	85	90	83	200
		289A+295A	43.5	52.3	99	100	95	263	100	100	97	265
		292A+295A	50.0	60.2	93	100	104	278	95	100	106	280
575-3-60	LOW	NONE	—	—	21	25	22	99	25	30	26	103
		290A	10.0	9.6	33	35	33	109	37	40	37	113
		293A	16.5	15.9	41	45	40	115	44	45	44	119
		296A	33.5	32.2	61	70	59	131	65	70	63	135
		290A+296A	43.5	41.9	73	80	70	183	77	80	74	187
		293A+296A	50.0	48.1	69	70	77	195	73	80	81	199
	MED	NONE	—	—	22	25	23	108	26	30	27	112
		290A	10.0	9.6	34	35	34	118	38	40	38	122
		293A	16.5	15.9	42	45	41	124	45	45	45	128
		296A	33.5	32.2	62	70	60	140	66	70	64	144
		290A+296A	43.5	41.9	74	80	71	192	78	80	75	196
		293A+296A	50.0	48.1	70	80	78	204	74	80	82	208
	HIGH	NONE	—	—	27	30	28	120	31	35	32	124
		290A	10.0	9.6	39	45	39	130	43	45	43	134
		293A	16.5	15.9	47	50	46	136	51	60	51	140
		296A	33.5	32.2	67	70	65	152	71	80	69	156
		290A+296A	43.5	41.9	79	80	76	204	83	90	81	208
		293A+296A	50.0	48.1	75	80	83	216	79	90	88	220

See Legend and Notes on page 58.

APPENDIX E — WIRING DIAGRAMS

50HCQA					
SIZE	VOLTAGE	CONTROL		POWER	
		DRAWING	PAGE	DRAWING	PAGE
A04	208/230 - 1 - 60 208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM501434 - J 48TM501434 - J 48TM501434 - J 48TM501520 - J	85 85 85 86	48TM501435 - I 48TM501436 - I 48TM501515 - K 48TM501516 - K	93 94 95 96
A05	208/230 - 1 - 60 208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM501434 - J 48TM501434 - J 48TM501434 - J 48TM501520 - J	85 85 85 86	48TM501435 - I 48TM501436 - I 48TM501515 - K 48TM501516 - K	93 94 95 96
A06	208/230 - 1 - 60 208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM502975 - G 48TM502975 - G 48TM502975 - G 48TM502976 - G	87 87 87 88	48TM501435 - I 48TM501436 - I 48TM501515 - K 48TM501516 - K	93 94 95 96
A07	208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM502826 - G 48TM502826 - G 48TM502826 - G	89 89 89	48TM502827 - D 48TM502827 - D 48TM502827 - D	97 97 97

50HCQD					
SIZE	VOLTAGE	CONTROL		POWER	
		DRAWING	PAGE	DRAWING	PAGE
D07	208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM002691 - A 48TM002691 - A 48TM002691 - A	90 90 90	48TM002724 48TM002724 48TM002724	98 98 98
D08	208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM501370 - P 48TM501370 - P 48TM501370 - P	91 91 91	48TM501371 - M 48TM501371 - M 48TM501371 - M	99 99 99
D09	208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM501370 - P 48TM501370 - P 48TM501370 - P	91 91 91	48TM501371 - M 48TM501371 - M 48TM501371 - M	99 99 99
D12	208/230 - 3 - 60 460 - 3 - 60 575 - 3 - 60	48TM501926 - L 48TM501926 - L 48TM501926 - L	92 92 92	48TM501927 - H 48TM501958 - H 48TM501958 - H	100 101 101
	PremierLink*	48TM501529 - H	102		102
	RTU Open*	50HE501687 - C	103		103

* PremierLink™ and RTU Open control labels overlay a portion of the base unit control label. The base unit label drawing and the control option drawing are required to provide a complete unit control diagram.
NOTE: Component arrangement on Control; Legend on Power Schematic.

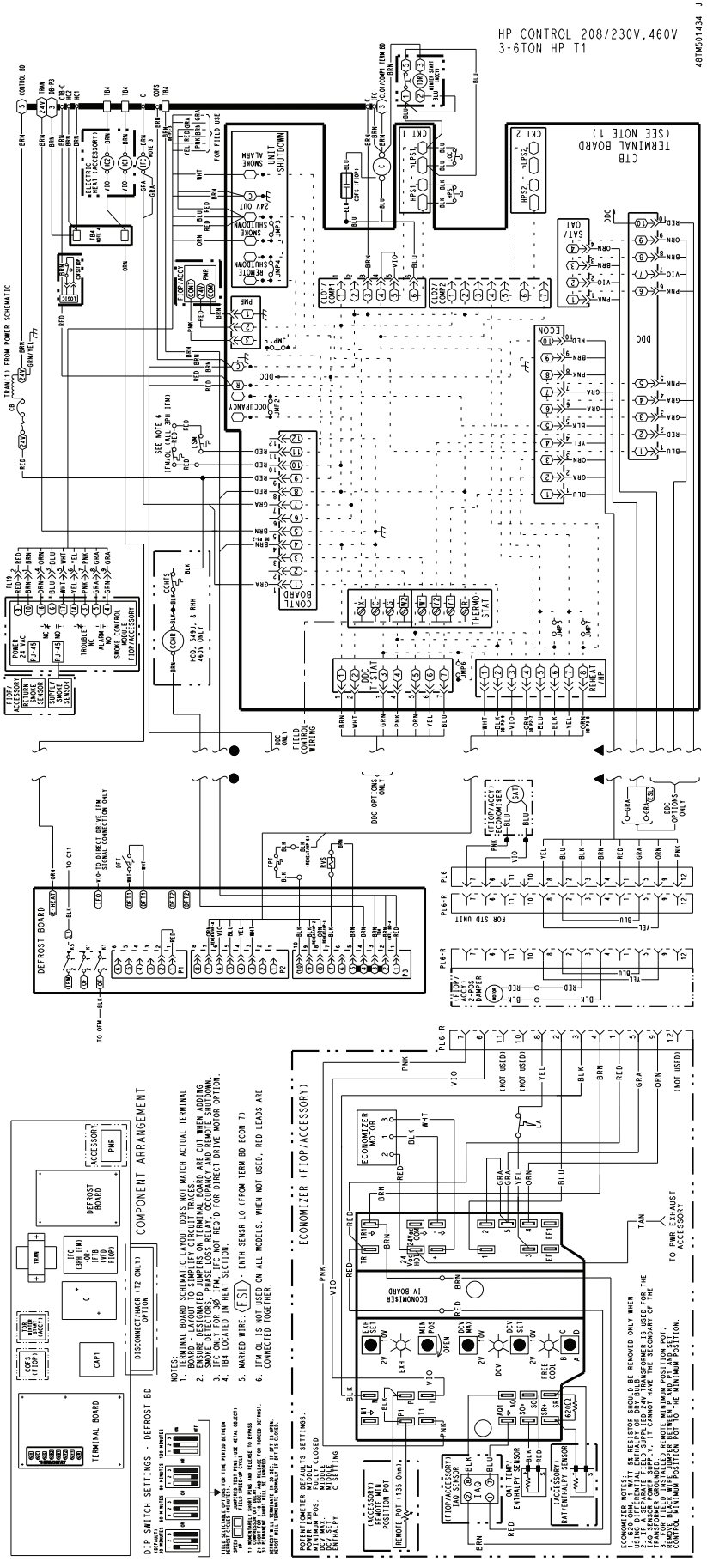


Fig. B — 50HCQA04/A05 Control Wiring Diagram - 208/230-1-60; 208/230-3-60; 460-3-60

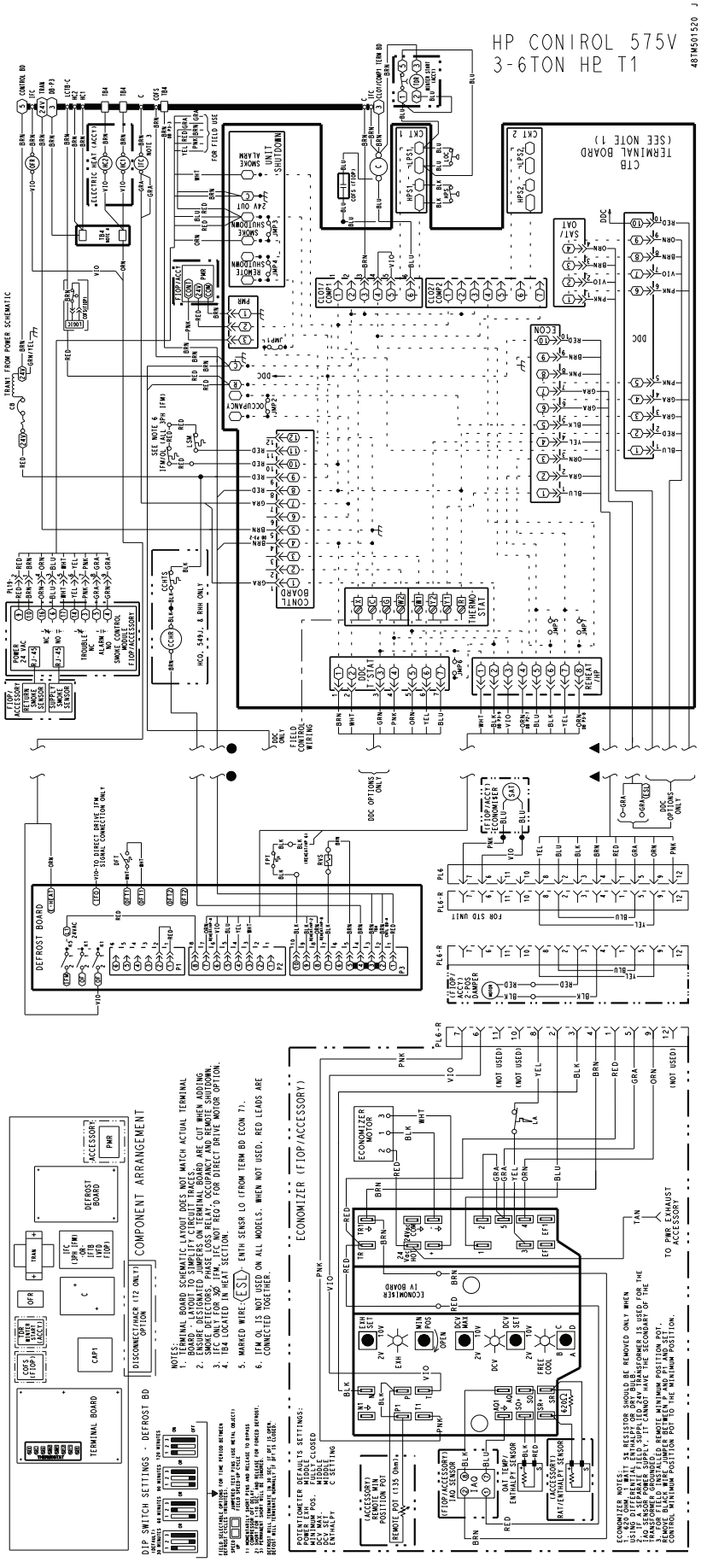


Fig. C — 50HCQA04/A05 Control Wiring Diagram — 575-3-60

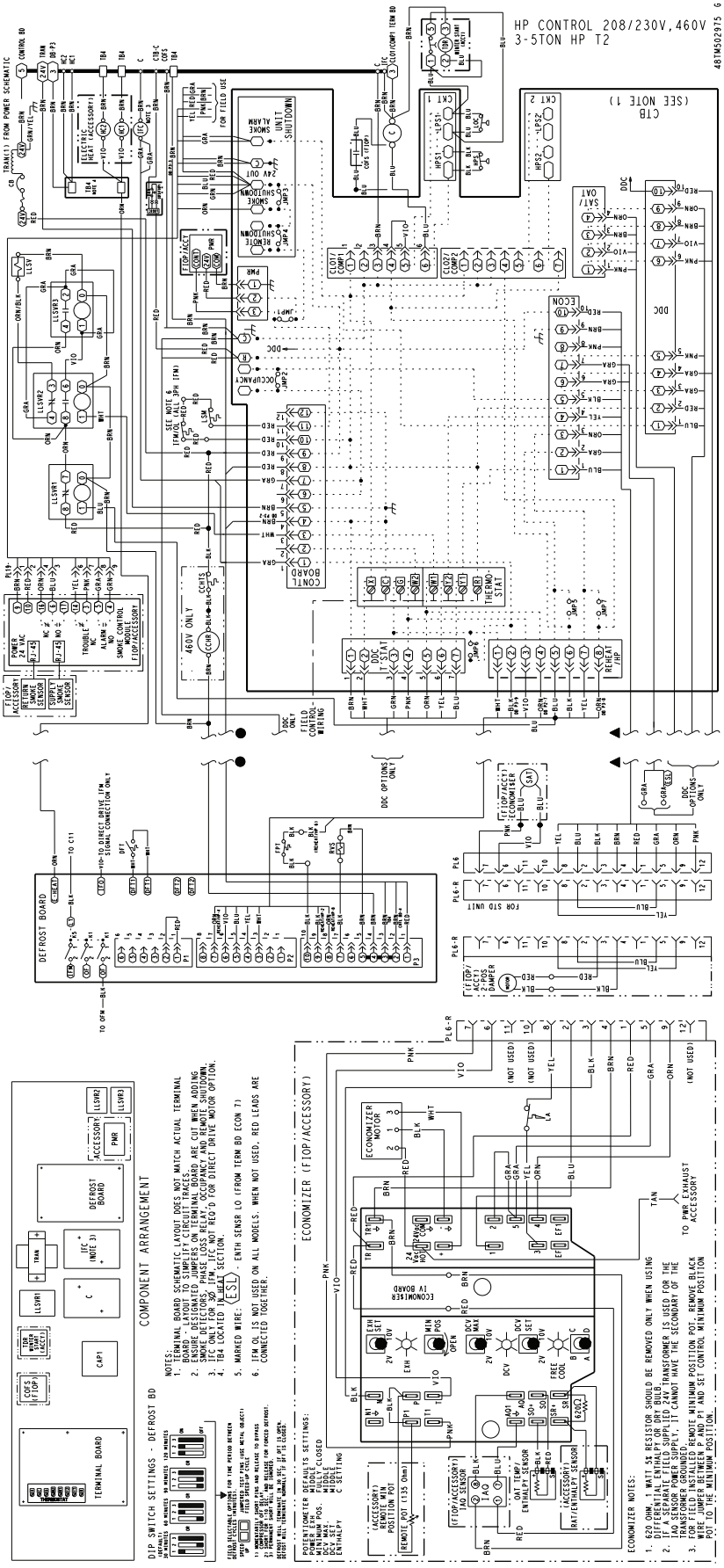


Fig. D — 50HCQ*06 Control Wiring Diagram — 208/230-1-60; 208/230-3-60; 460-3-60

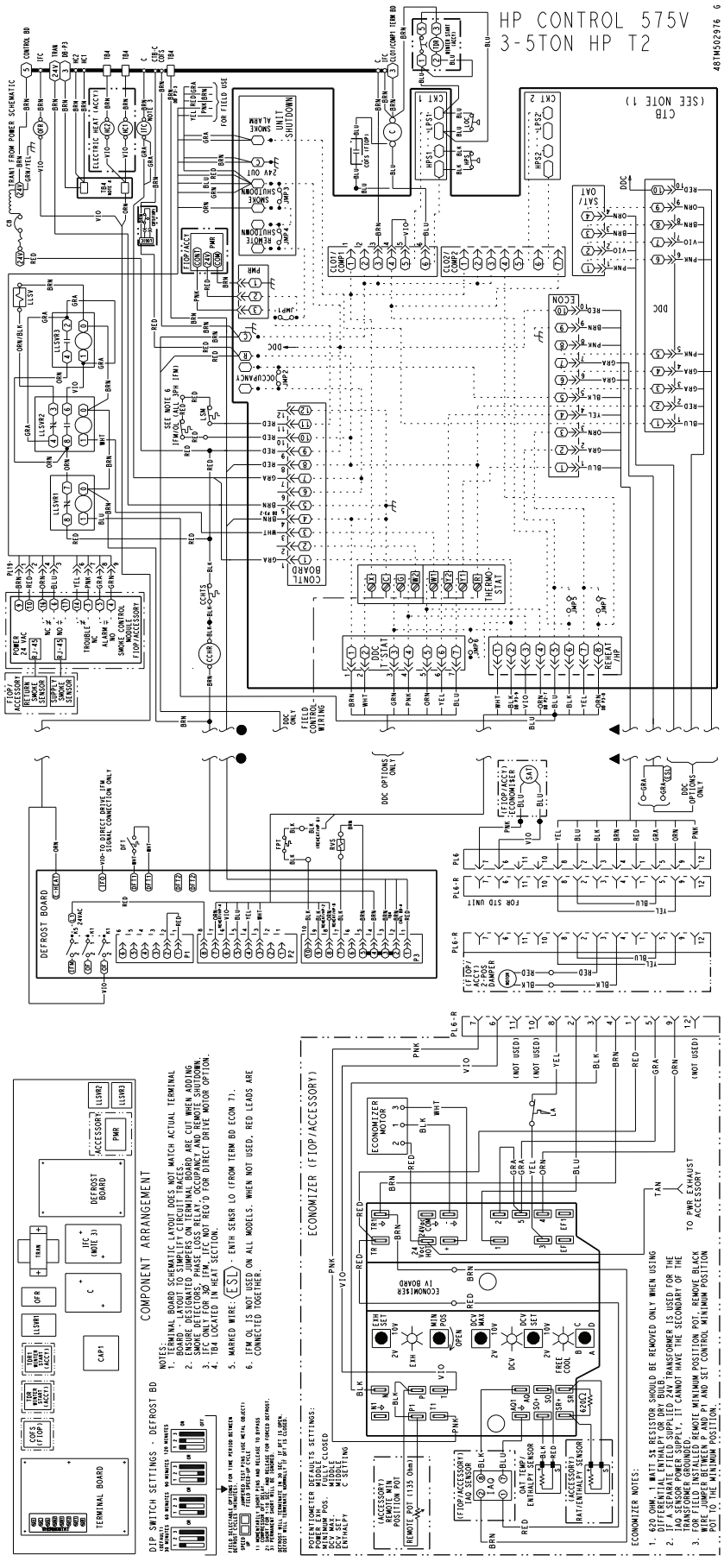


Fig. E — 50HCQ*06 Control Wiring Diagram — 575-3-60

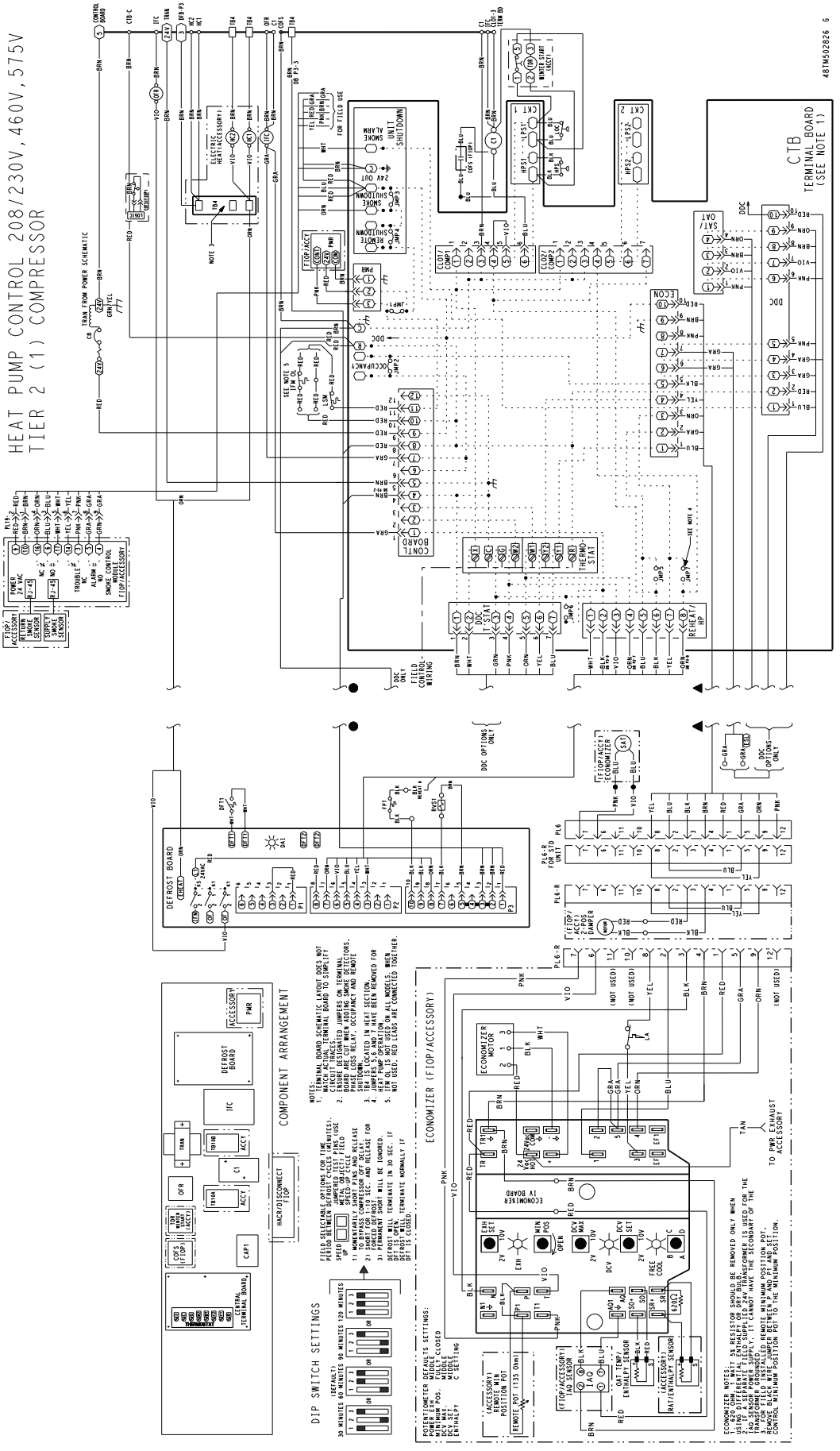


Fig. F — 50HCQA07 Control Wiring Diagram — 208/230-1-60; 208/230-3-60; 460-3-60; 575-3-60

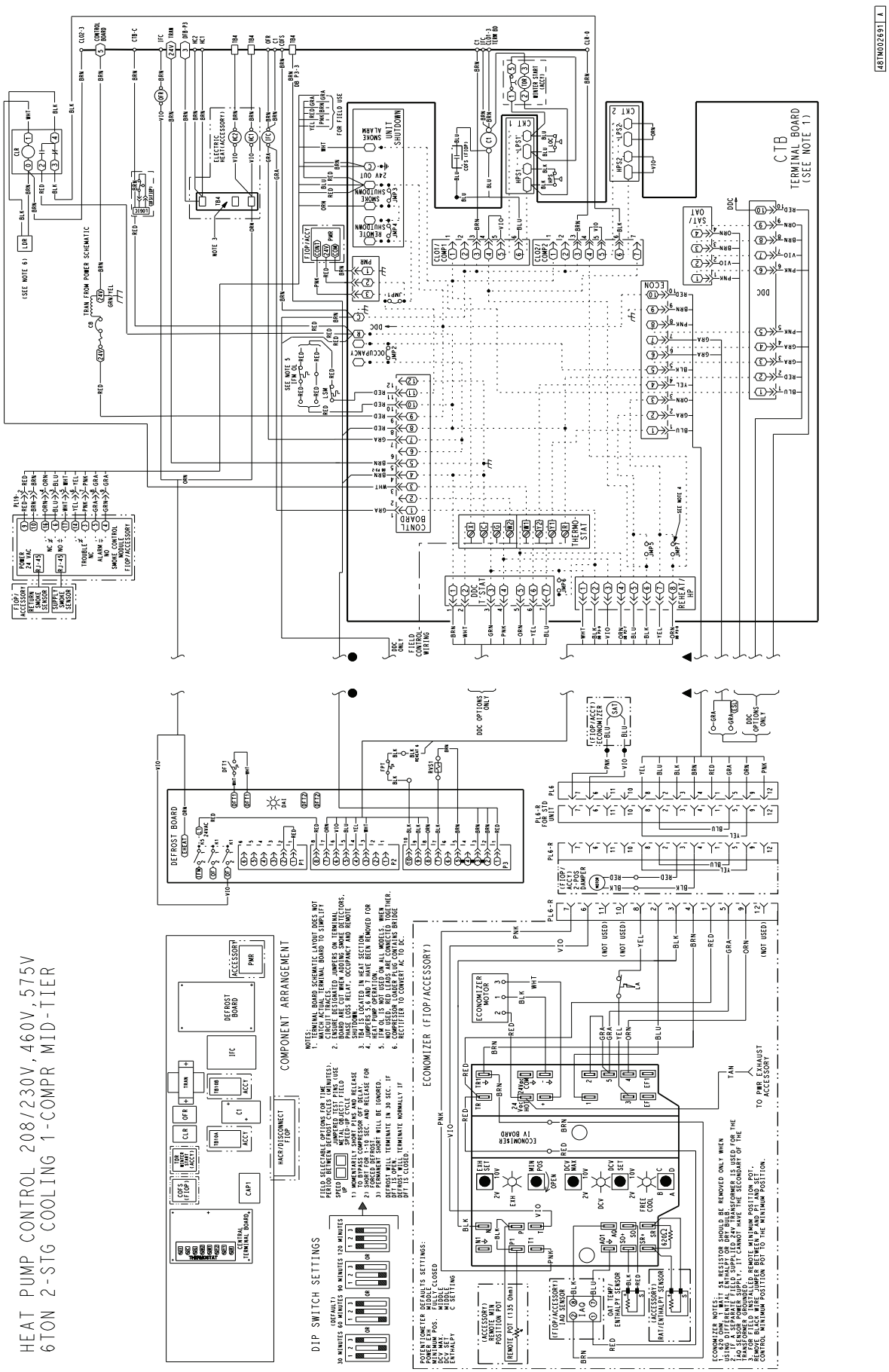


Fig. G — 50HCQD07 Heat Pump Control Wiring Diagram — 208/230; 460; 575 Tier 2 (1) Compressor

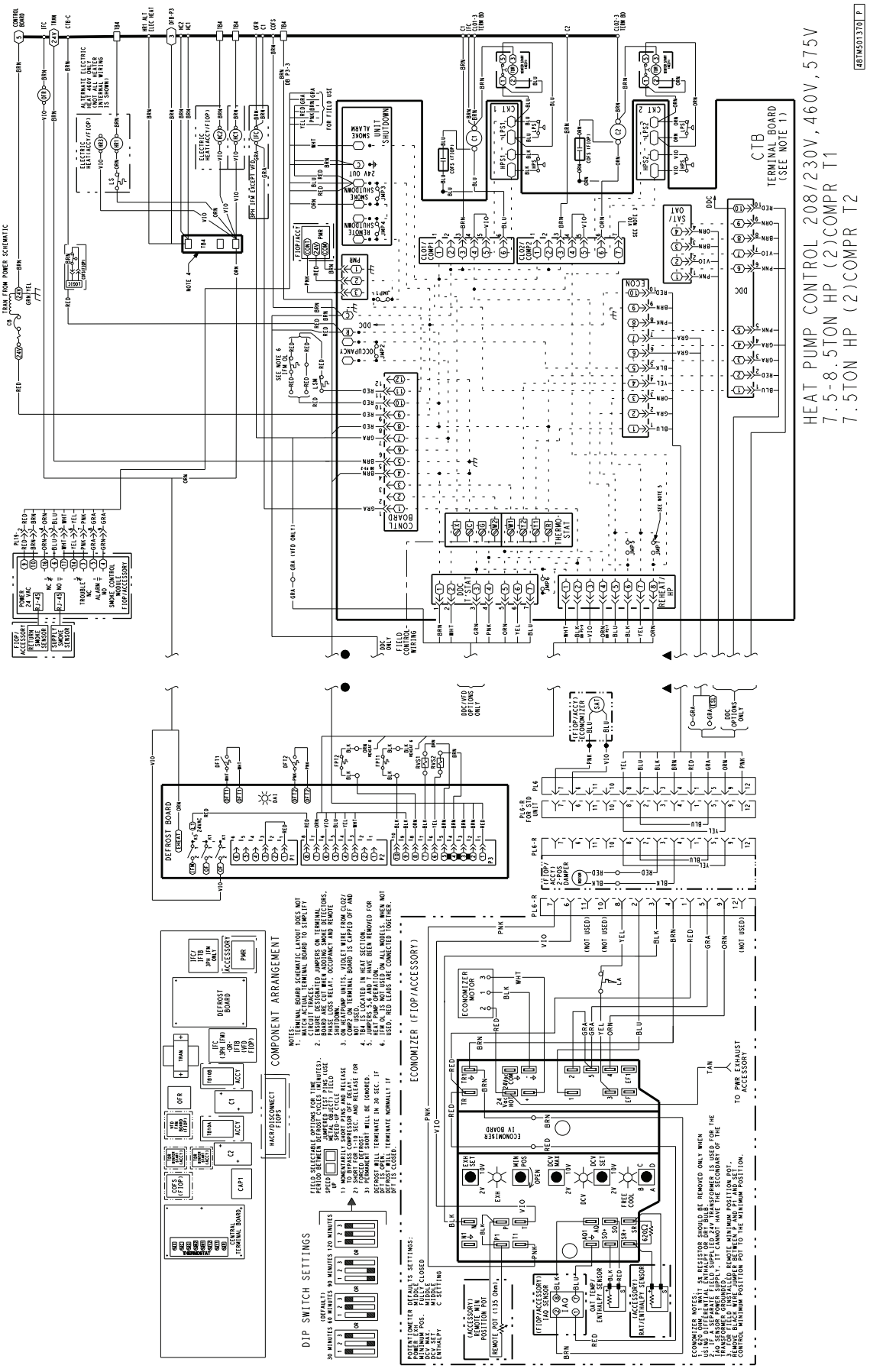


Fig. H — 50HCQ*08/09 Control Wiring Diagram — 208/230-1-60; 208/230-3-60; 460-3-60; 575-3-60

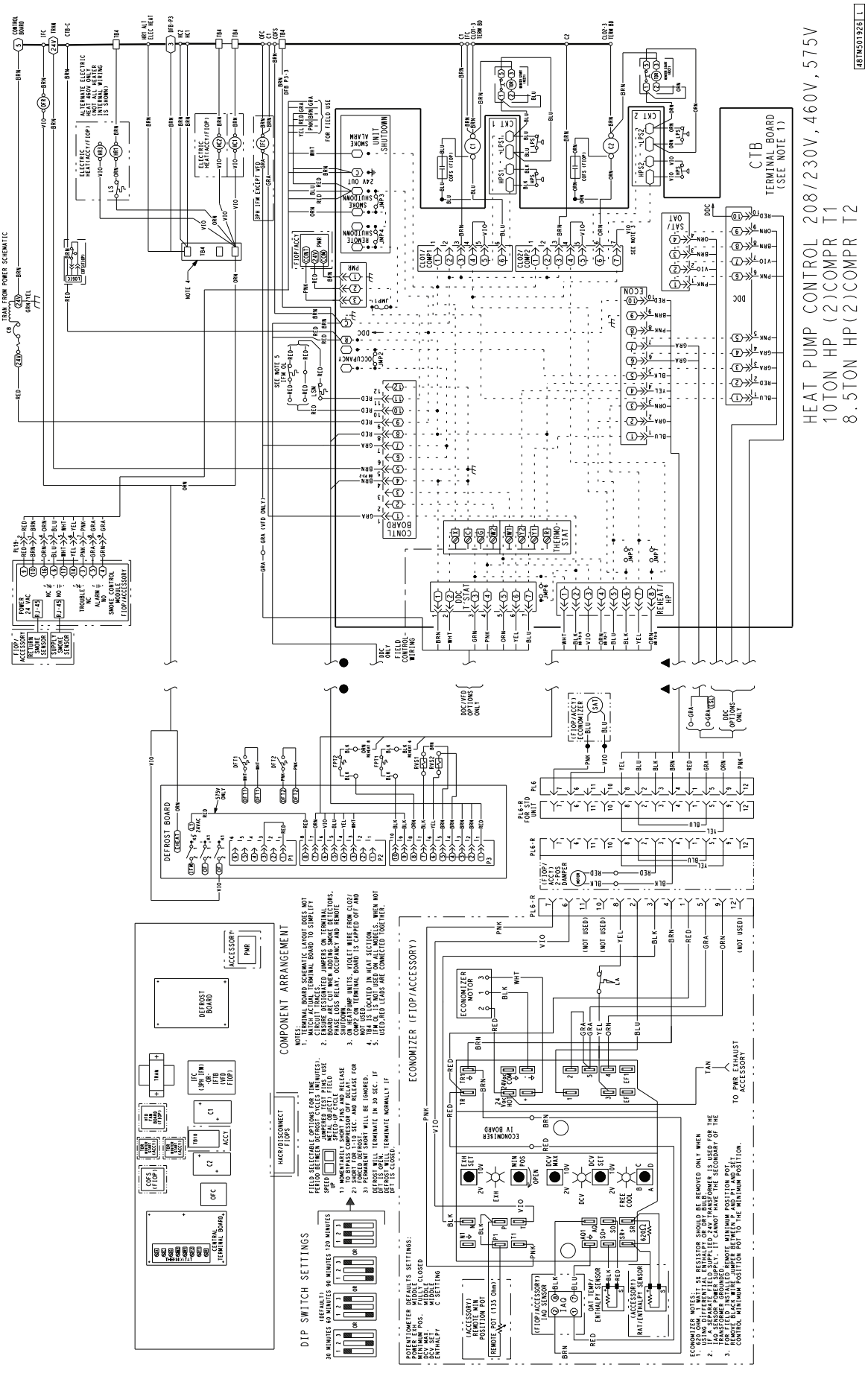


Fig. I — 50HCQ*12 Control Wiring Diagram — 208/230-1-60; 208/230-3-60; 460-3-60; 575-3-60

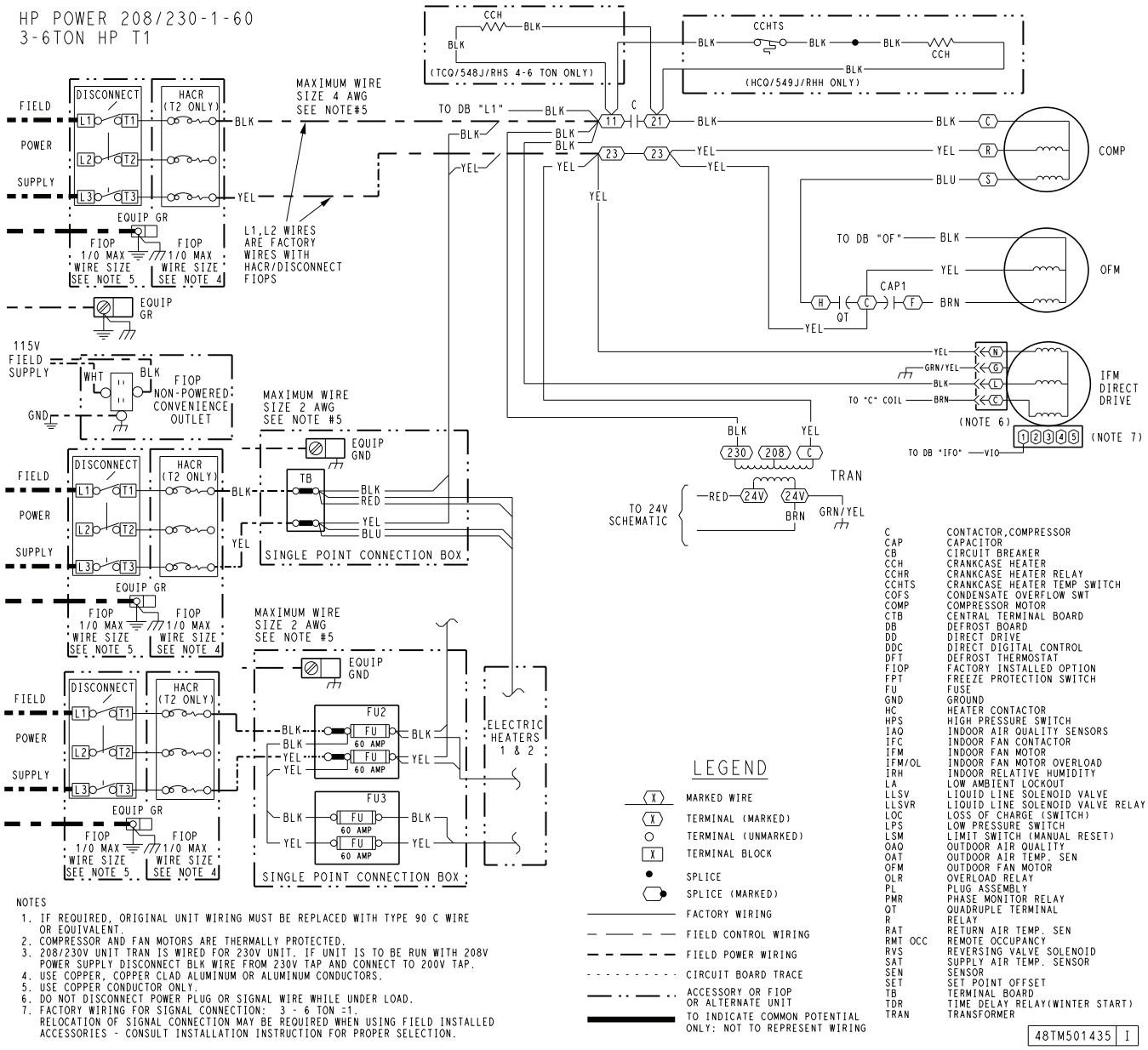


Fig. J — 50HCQ*04/05/06 Power Wiring Diagram — 208/230-1-60

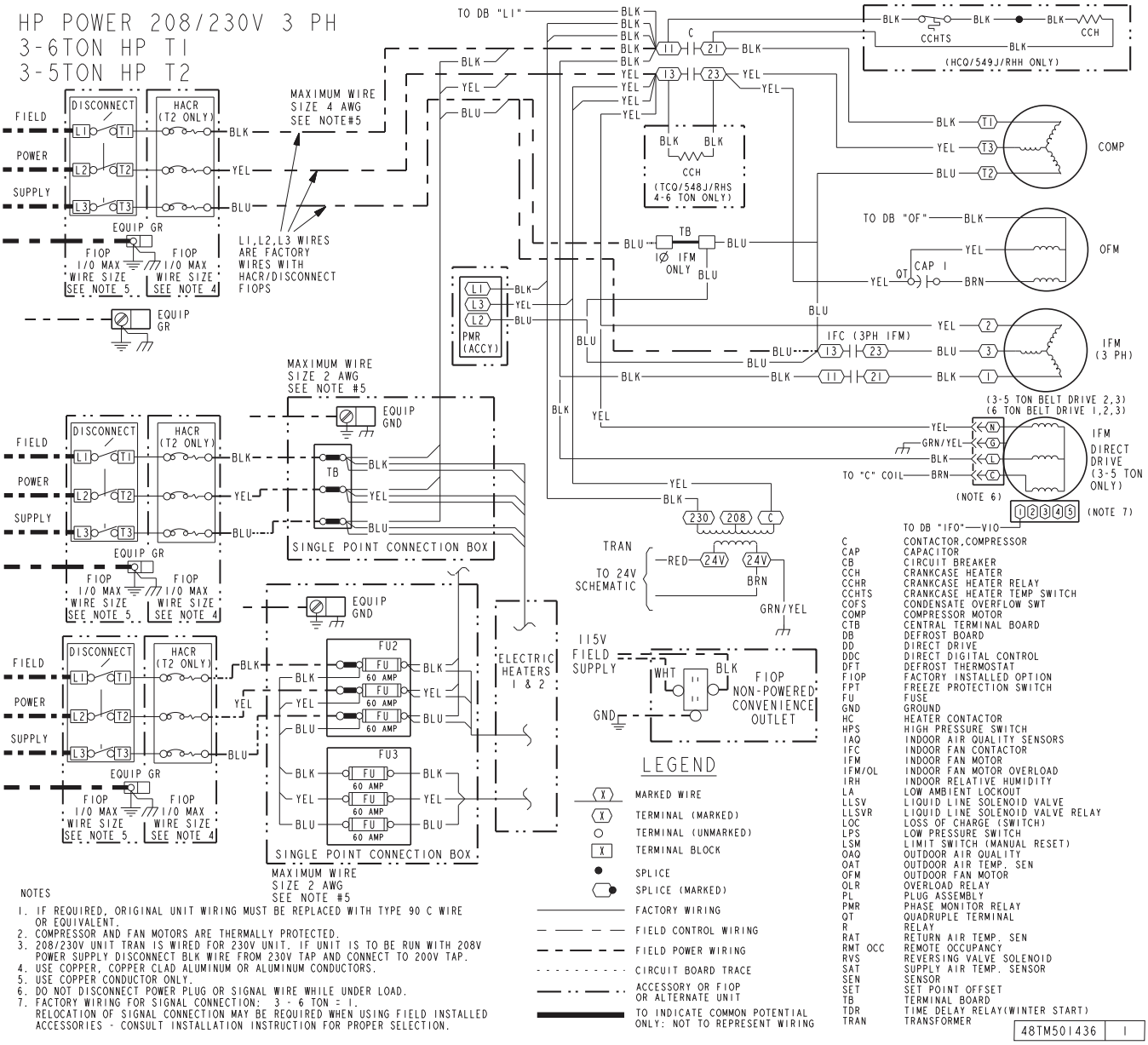
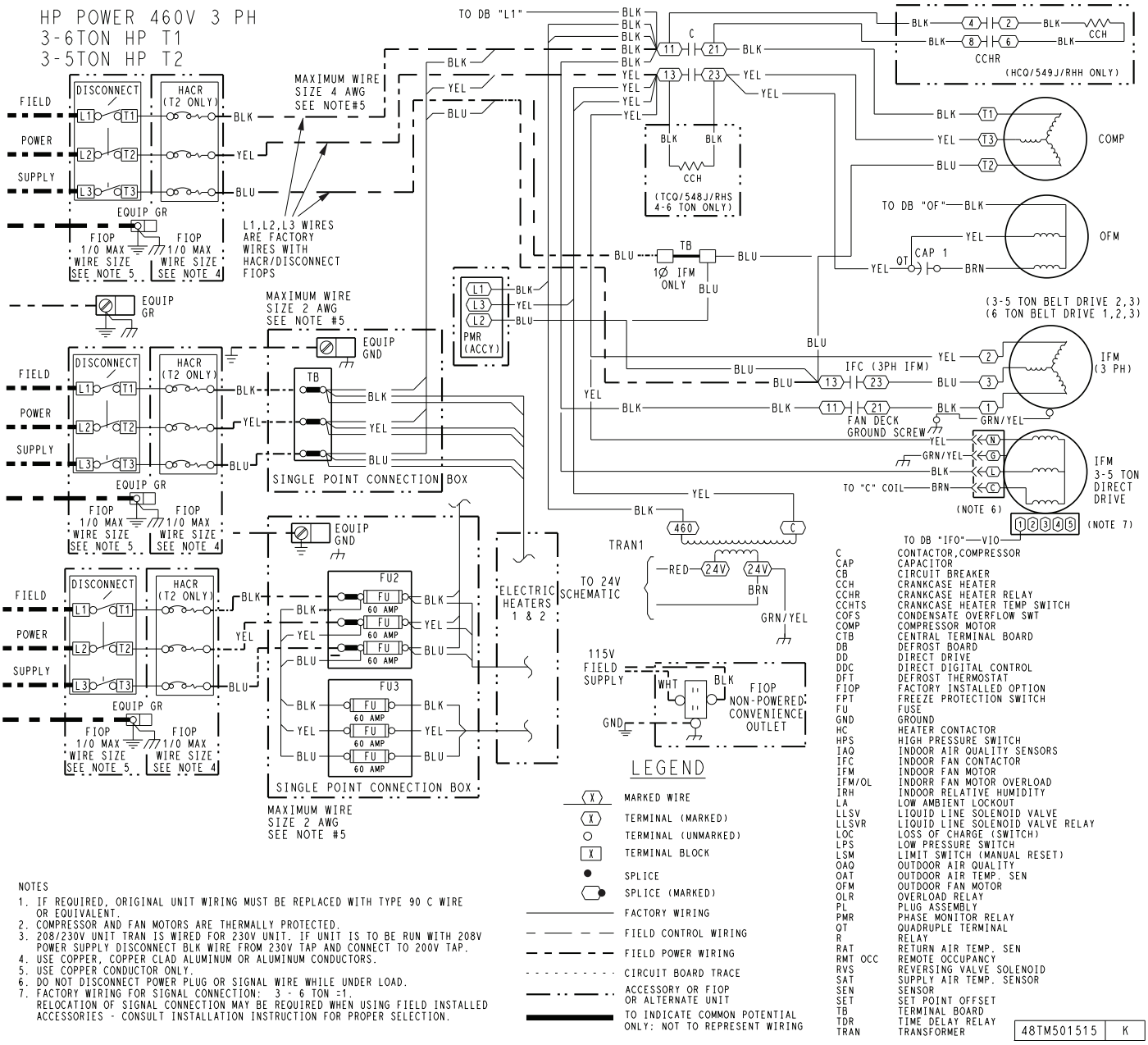


Fig. K — 50HCQ*04/05/06 Power Wiring Diagram — 208/230-3-60

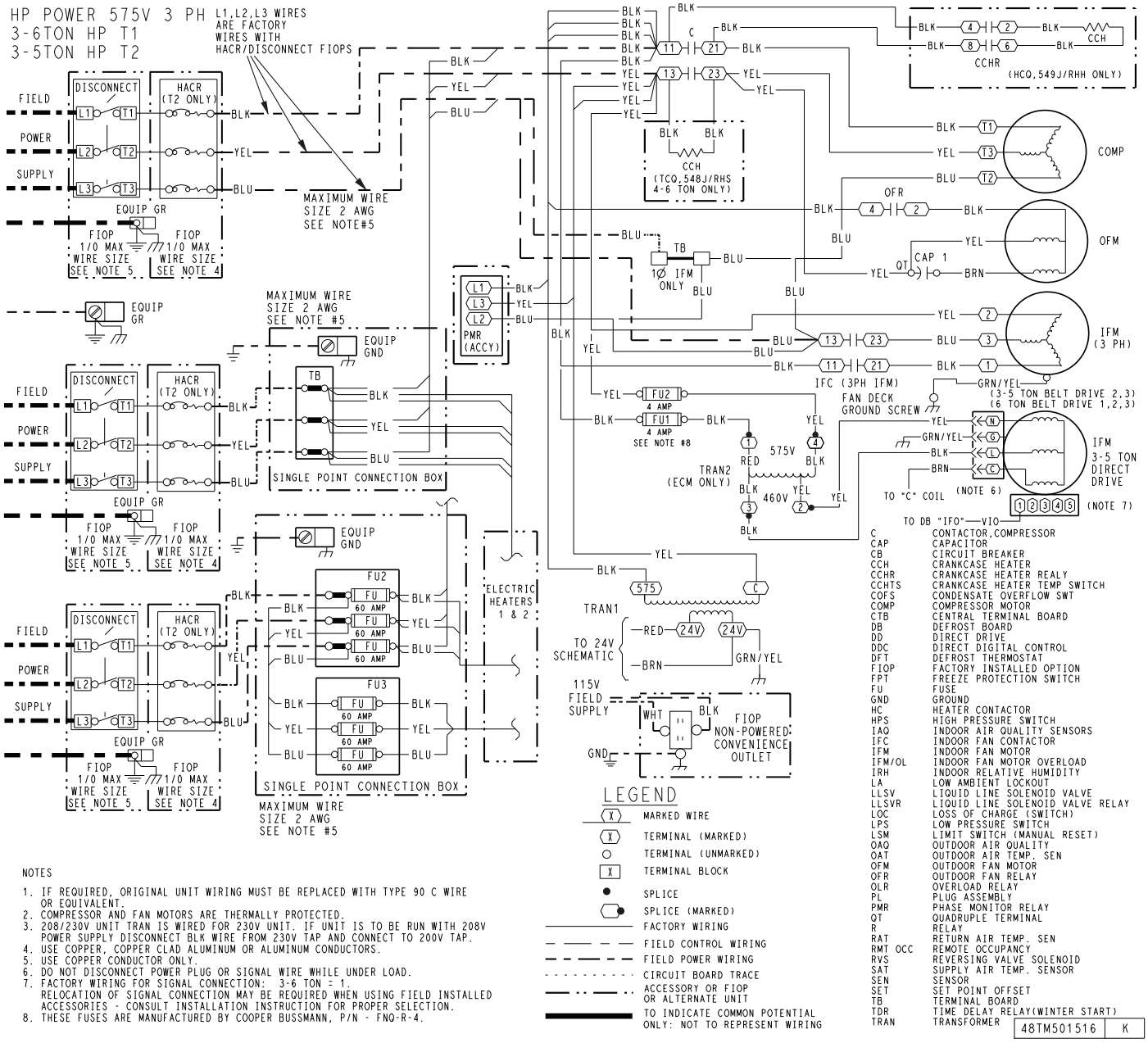


NOTES
1. IF REQUIRED, ORIGINAL UNIT WIRING MUST BE REPLACED WITH TYPE 90 C WIRE OR EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED.
3. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS.
5. USE COPPER CONDUCTOR ONLY.
6. DO NOT DISCONNECT POWER PLUG OR SIGNAL WIRE WHILE UNDER LOAD.
7. FACTORY WIRING FOR SIGNAL CONNECTION: 3 - 6 TON =1. RELOCATION OF SIGNAL CONNECTION MAY BE REQUIRED WHEN USING FIELD INSTALLED ACCESSORIES - CONSULT INSTALLATION INSTRUCTION FOR PROPER SELECTION.

C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER RELAY
CCHTS	CRANKCASE HEATER TEMP SWITCH
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CTB	CENTRAL TERMINAL BOARD
DB	DEFROST BOARD
DD	DIRECT DRIVE
DDC	DIRECT DIGITAL CONTROL
DFT	DEFROST THERMOSTAT
FIOP	FACTORY INSTALLED OPTION
FPT	FREEZE PROTECTION SWITCH
FU	FUSE
GND	GROUND
HC	HEATER CONTACTOR
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFC	INDOOR FAN CONTACTOR
IFM	INDOOR FAN MOTOR
IFM/OL	INDORR FAN MOTOR OVERLOAD
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LLSV	LIQUID LINE SOLENOID VALVE
LLSVR	LIQUID LINE SOLENOID VALVE RELAY
LOC	LOSS OF CHARGE (SWITCH)
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OLR	OVERLOAD RELAY
PL	PLUG ASSEMBLY
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
RVS	REVERSING VALVE SOLENOID
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
TB	TERMINAL BOARD
TDR	TIME DELAY RELAY
TRAN	TRANSFORMER

48TM501515 | K

Fig. L — 50HCQ*04/05/06 Power Wiring Diagram — 460-3-60



NOTES

1. IF REQUIRED, ORIGINAL UNIT WIRING MUST BE REPLACED WITH TYPE 90 C WIRE OR EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED.
3. 208/230V UNIT TRAN IS WIRED FOR 230V UNIT. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS.
5. USE COPPER CONDUCTOR ONLY.
6. DO NOT DISCONNECT POWER PLUG OR SIGNAL WIRE WHILE UNDER LOAD.
7. FACTORY WIRING FOR SIGNAL CONNECTION: 3-6 TON = 1. RELOCATION OF SIGNAL CONNECTION MAY BE REQUIRED WHEN USING FIELD INSTALLED ACCESSORIES - CONSULT INSTALLATION INSTRUCTION FOR PROPER SELECTION.
8. THESE FUSES ARE MANUFACTURED BY COOPER BUSSMANN, P/N - FNQ-R-4.

LEGEND

X	MARKED WIRE
X	TERMINAL (MARKED)
	TERMINAL (UNMARKED)
X	TERMINAL BLOCK
	SPLICE
	SPLICE (MARKED)
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP OR ALTERNATE UNIT
	TO INDICATE COMMON POTENTIAL ONLY: NOT TO REPRESENT WIRING

C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCHR	CRANKCASE HEATER REALY
CCHTS	CRANKCASE HEATER TEMP SWITCH
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CTB	CENTRAL TERMINAL BOARD
DB	DEFROST BOARD
DD	DIRECT DRIVE
DDC	DIRECT DIGITAL CONTROL
DFT	DEFROST THERMOSTAT
FIOP	FACTORY INSTALLED OPTION
FPT	FREEZE PROTECTION SWITCH
FU	FUSE
GND	GROUND
HC	HEATER CONTACTOR
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFC	INDOOR FAN CONTACTOR
IFM	INDOOR FAN MOTOR
IFM/OL	INDOOR FAN MOTOR OVERLOAD
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LLSV	LIQUID LINE SOLENOID VALVE
LLSVR	LIQUID LINE SOLENOID VALVE RELAY
LOC	LOSS OF CHARGE (SWITCH)
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OFR	OUTDOOR FAN RELAY
OLR	OVERLOAD RELAY
PL	PLUG ASSEMBLY
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
RVS	REVERSING VALVE SOLENOID
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
TB	TERMINAL BOARD
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER

48TM501516 | K

Fig. M — 50HCQ*04/05/06 Power Wiring Diagram — 575-3-60

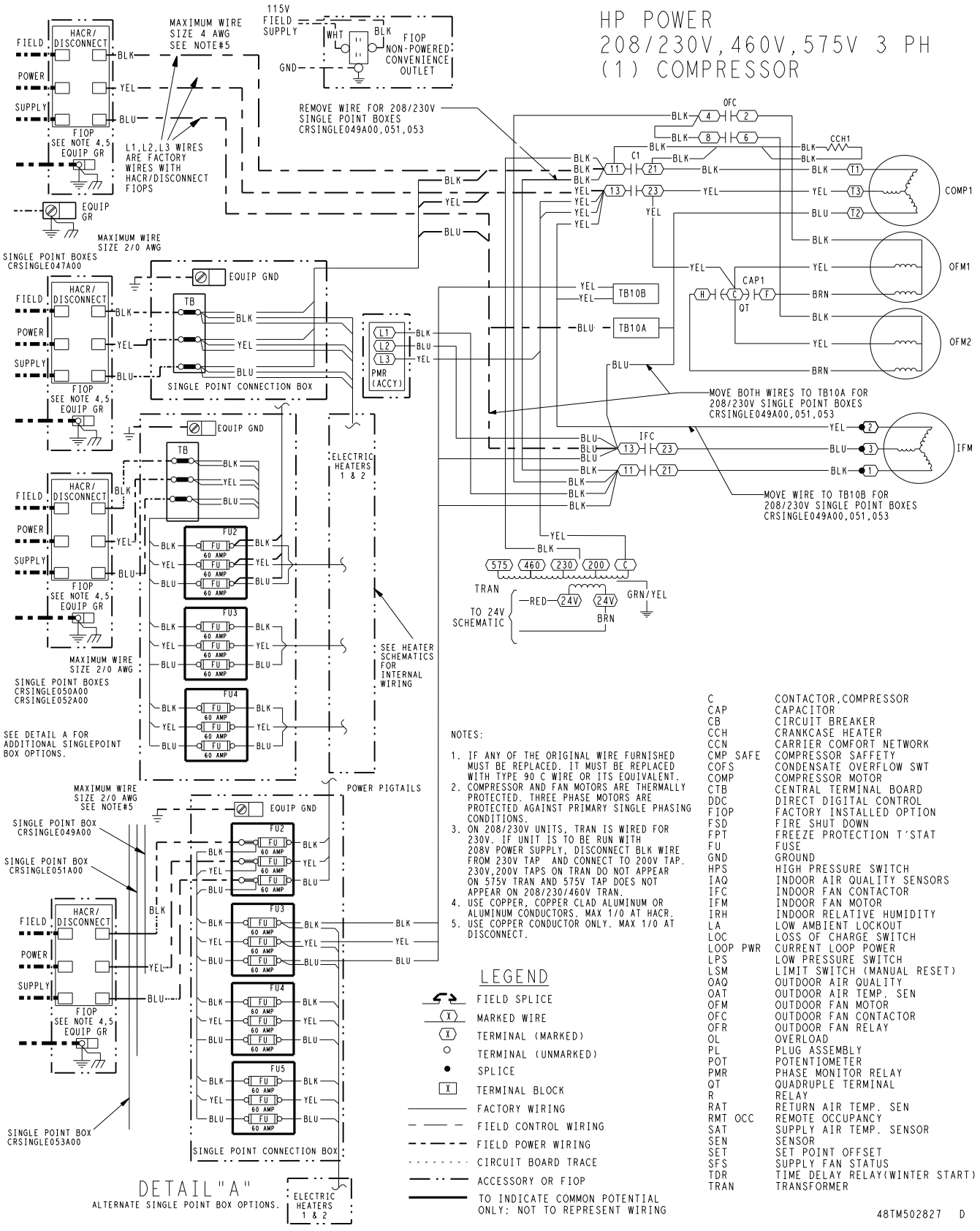


Fig. N — 50HCQA07 Power Wiring Diagram — 208/230-3-60; 460-3-60; 575-3-60

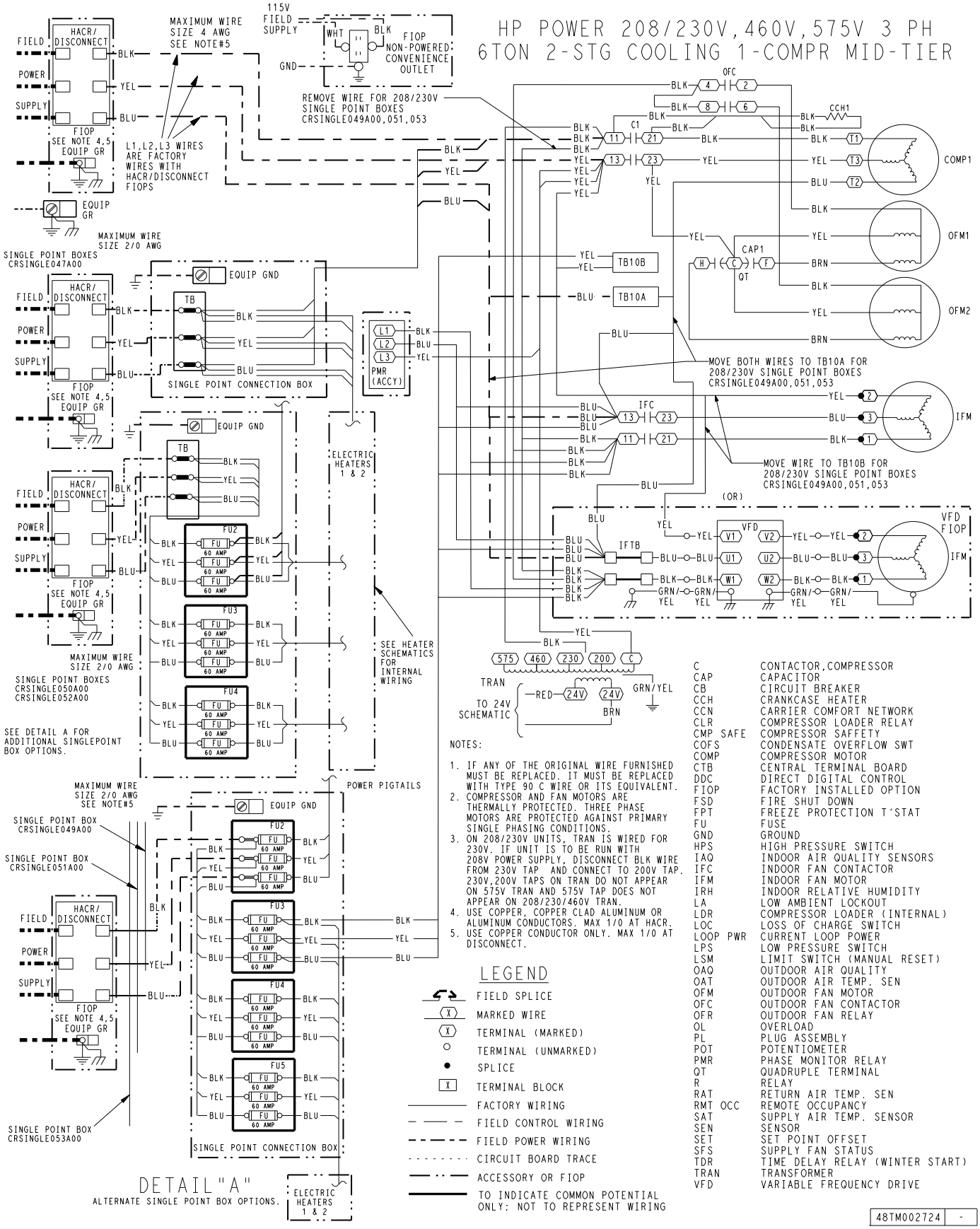
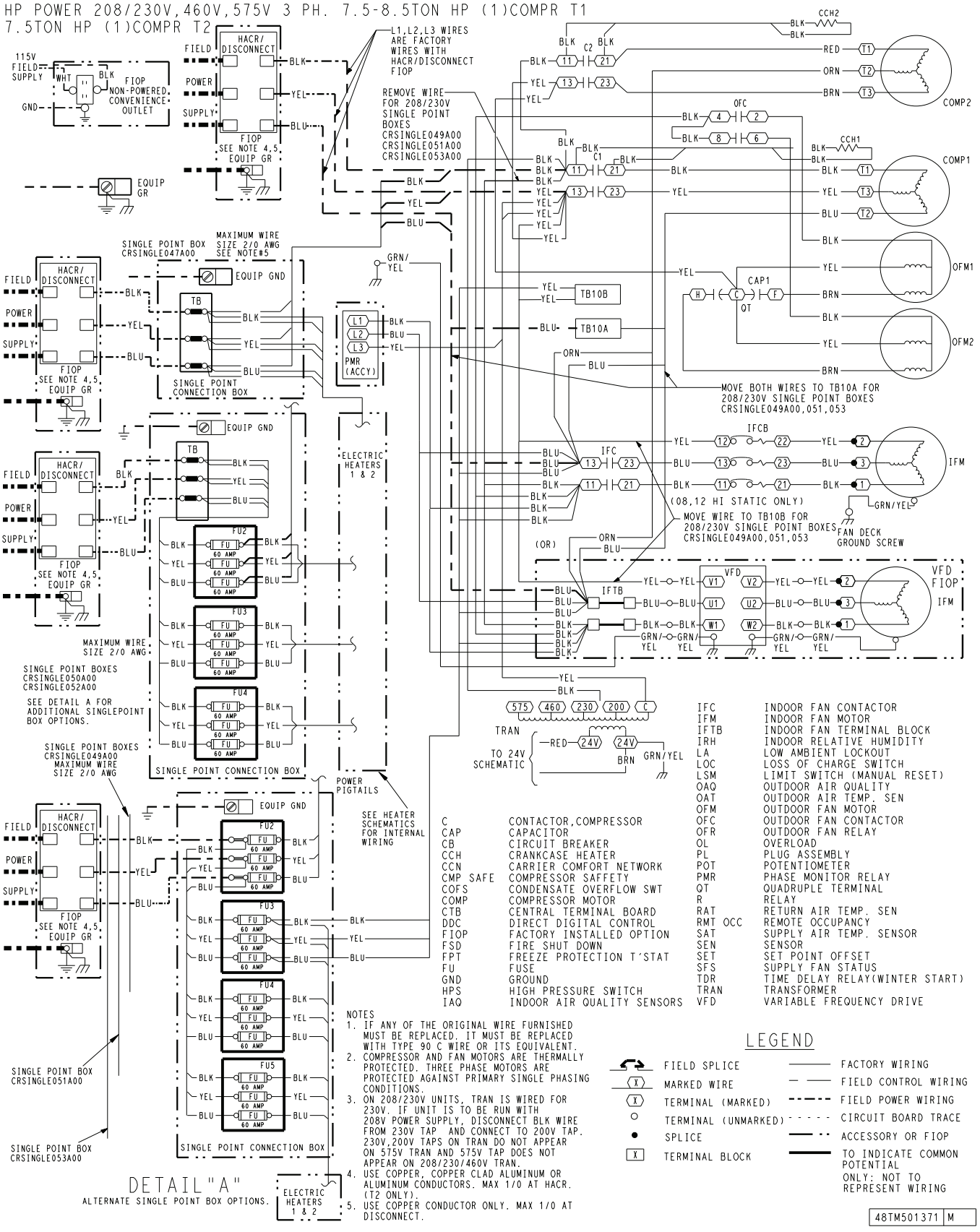


Fig. O — 50HCQD07 Power Wiring Diagram — 208/230-3-60; 460-3-60; 575-3-60



C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCN	CARRIER COMFORT NETWORK
CMP SAFE	COMPRESSOR SAFFETY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CTB	CENTRAL TERMINAL BOARD
DDC	DIRECT DIGITAL CONTROL
FIOP	FACTORY INSTALLED OPTION
FSD	FIRE SHUT DOWN
FPT	FREEZE PROTECTION T'STAT
FU	FUSE
GND	GROUND
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS

IFC	INDOOR FAN CONTACTOR
IFM	INDOOR FAN MOTOR
IFTB	INDOOR FAN TERMINAL BLOCK
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LOC	LOSS OF CHARGE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFM	OUTDOOR FAN MOTOR
OFC	OUTDOOR FAN CONTACTOR
OFR	OUTDOOR FAN RELAY
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
SFS	SUPPLY FAN STATUS
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

NOTES
1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
3. ON 208/230V UNITS, TRAN IS WIRED FOR 230V. IF UNIT IS TO BE RUN WITH 208V POWER SUPPLY, DISCONNECT BLK WIRE FROM 230V TAP AND CONNECT TO 200V TAP. 230V,200V TAPS ON TRAN DO NOT APPEAR ON 575V TRAN AND 575V TAP DOES NOT APPEAR ON 208/230/460V TRAN.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS. MAX 1/0 AT HACR. (T2 ONLY).
5. USE COPPER CONDUCTOR ONLY. MAX 1/0 AT DISCONNECT.

LEGEND

FIELD SPLICE	FACTORY WIRING
MARKED WIRE	FIELD CONTROL WIRING
TERMINAL (MARKED)	FIELD POWER WIRING
TERMINAL (UNMARKED)	CIRCUIT BOARD TRACE
SPLICE	ACCESSORY OR FIOP
TERMINAL BLOCK	TO INDICATE COMMON POTENTIAL ONLY: NOT TO REPRESENT WIRING

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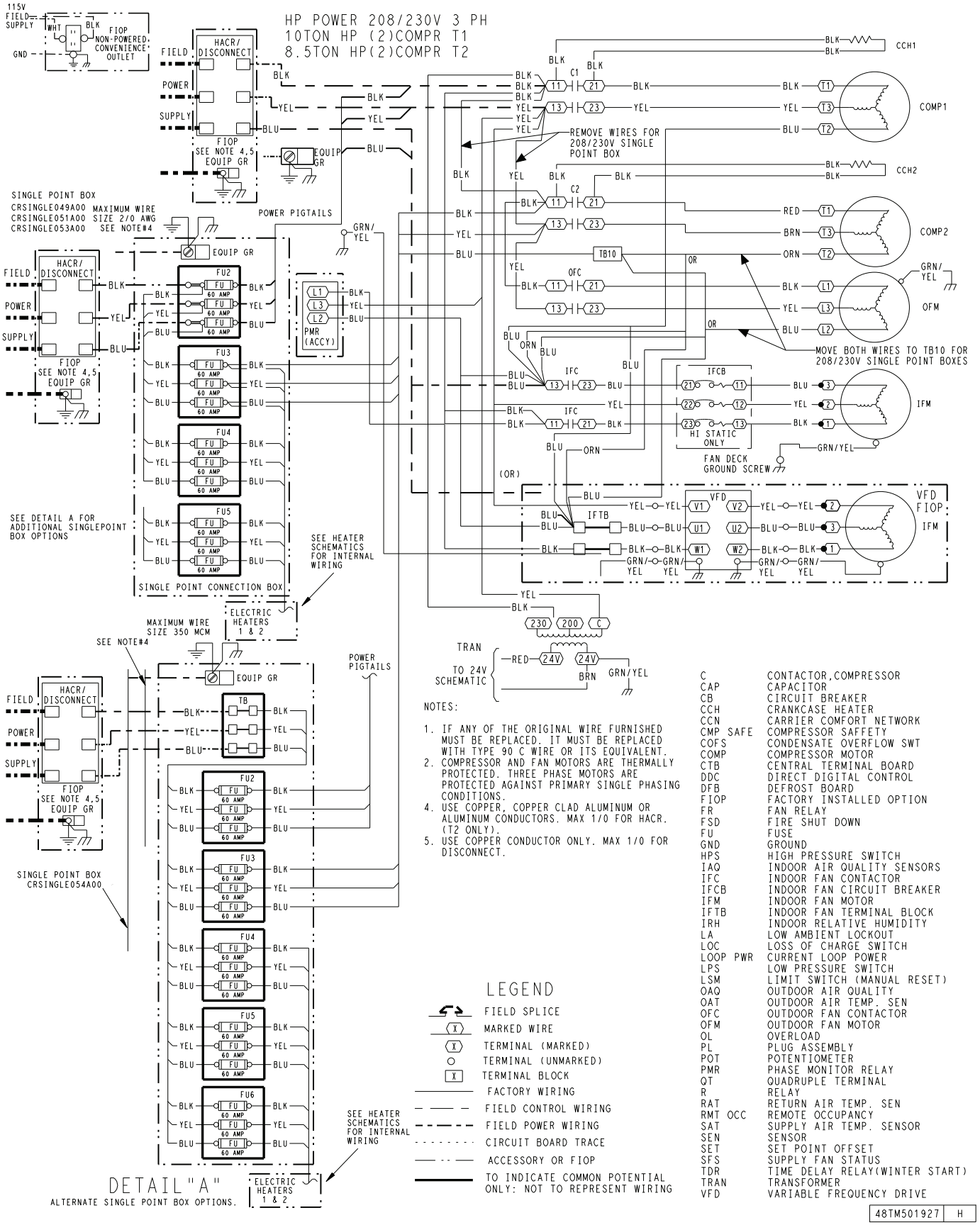
Fig. P — 50HCQ*08/09 Power Wiring Diagram — 208/230-3-60; 460-3-60; 575-3-60



NOTES:

1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED, IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS. MAX 1/0 FOR HACR. (T2 ONLY).
5. USE COPPER CONDUCTOR ONLY. MAX 1/0 FOR DISCONNECT.

LEGEND

	FIELD SPLICE
X	MARKED WIRE
X	TERMINAL (MARKED)
	TERMINAL (UNMARKED)
X	TERMINAL BLOCK
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP
	TO INDICATE COMMON POTENTIAL ONLY: NOT TO REPRESENT WIRING

C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCN	CARRIER COMFORT NETWORK
CMP SAFE	COMPRESSOR SAFFETY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CTB	CENTRAL TERMINAL BOARD
DDC	DIRECT DIGITAL CONTROL
DFB	DEFROST BOARD
FIOP	FACTORY INSTALLED OPTION
FR	FAN RELAY
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFC	INDOOR FAN CONTACTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFM	INDOOR FAN MOTOR
IFTB	INDOOR FAN TERMINAL BLOCK
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LOC	LOSS OF CHARGE SWITCH
LOOP PWR	CURRENT LOOP POWER
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFC	OUTDOOR FAN CONTACTOR
OFM	OUTDOOR FAN MOTOR
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
SFS	SUPPLY FAN STATUS
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

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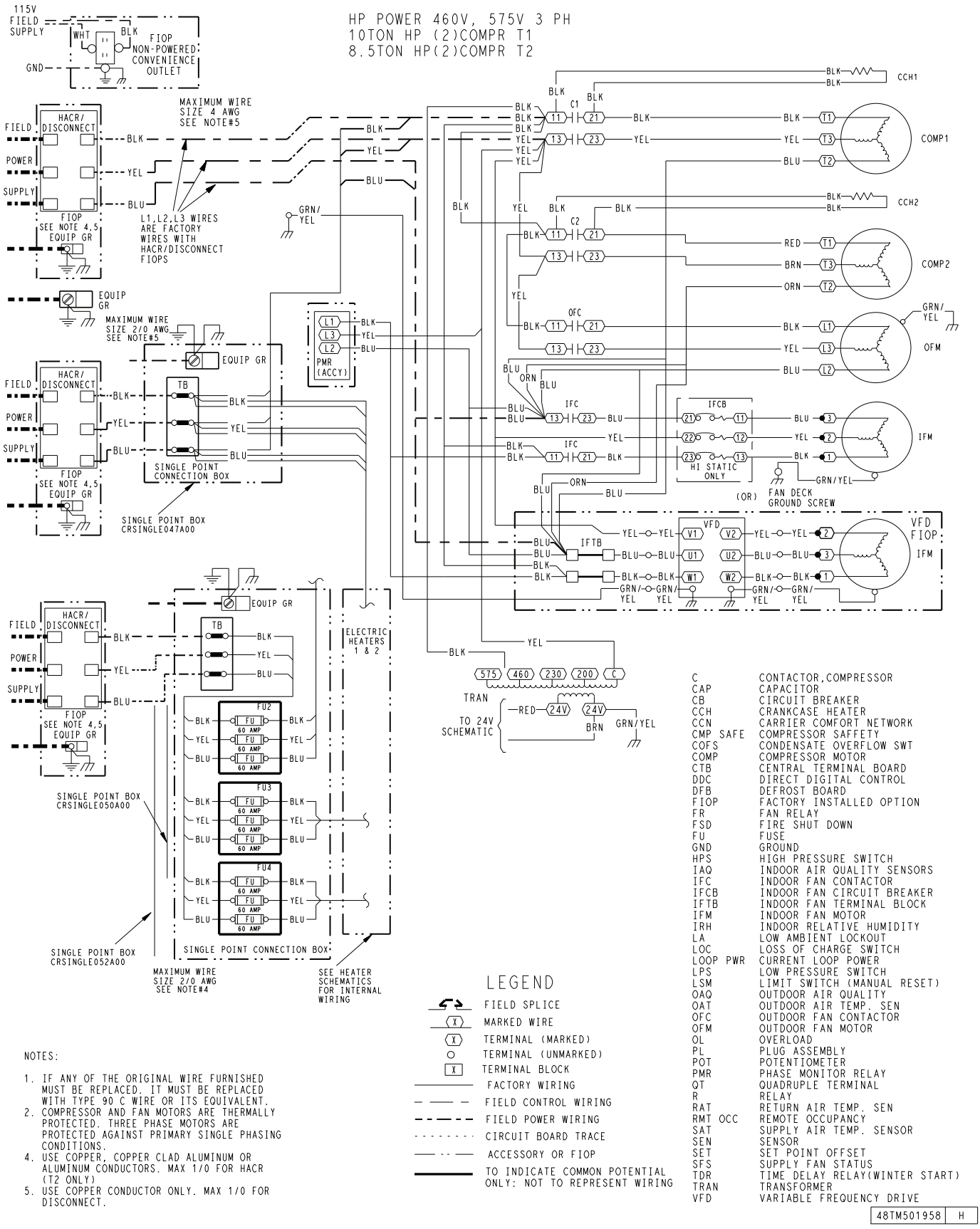
Fig. Q — 50HCQ*12 Power Wiring Diagram — 208/230-3-60



LEGEND

	FIELD SPLICE
X	MARKED WIRE
X	TERMINAL (MARKED)
	TERMINAL (UNMARKED)
X	TERMINAL BLOCK
	FACTORY WIRING
	FIELD CONTROL WIRING
	FIELD POWER WIRING
	CIRCUIT BOARD TRACE
	ACCESSORY OR FIOP
	TO INDICATE COMMON POTENTIAL ONLY: NOT TO REPRESENT WIRING

C	CONTACTOR,COMPRESSOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CCH	CRANKCASE HEATER
CCN	CARRIER COMFORT NETWORK
CMP SAFE	COMPRESSOR SAFFETY
COFS	CONDENSATE OVERFLOW SWT
COMP	COMPRESSOR MOTOR
CTB	CENTRAL TERMINAL BOARD
DDC	DIRECT DIGITAL CONTROL
DFB	DEFROST BOARD
FIOP	FACTORY INSTALLED OPTION
FR	FAN RELAY
FSD	FIRE SHUT DOWN
FU	FUSE
GND	GROUND
HPS	HIGH PRESSURE SWITCH
IAQ	INDOOR AIR QUALITY SENSORS
IFC	INDOOR FAN CONTACTOR
IFCB	INDOOR FAN CIRCUIT BREAKER
IFTB	INDOOR FAN TERMINAL BLOCK
IFM	INDOOR FAN MOTOR
IRH	INDOOR RELATIVE HUMIDITY
LA	LOW AMBIENT LOCKOUT
LOC	LOSS OF CHARGE SWITCH
LOOP PWR	CURRENT LOOP POWER
LPS	LOW PRESSURE SWITCH
LSM	LIMIT SWITCH (MANUAL RESET)
OAQ	OUTDOOR AIR QUALITY
OAT	OUTDOOR AIR TEMP. SEN
OFC	OUTDOOR FAN CONTACTOR
OFM	OUTDOOR FAN MOTOR
OL	OVERLOAD
PL	PLUG ASSEMBLY
POT	POTENTIOMETER
PMR	PHASE MONITOR RELAY
QT	QUADRUPLE TERMINAL
R	RELAY
RAT	RETURN AIR TEMP. SEN
RMT OCC	REMOTE OCCUPANCY
SAT	SUPPLY AIR TEMP. SENSOR
SEN	SENSOR
SET	SET POINT OFFSET
SFS	SUPPLY FAN STATUS
TDR	TIME DELAY RELAY(WINTER START)
TRAN	TRANSFORMER
VFD	VARIABLE FREQUENCY DRIVE

NOTES:

1. IF ANY OF THE ORIGINAL WIRE FURNISHED MUST BE REPLACED. IT MUST BE REPLACED WITH TYPE 90 C WIRE OR ITS EQUIVALENT.
2. COMPRESSOR AND FAN MOTORS ARE THERMALLY PROTECTED. THREE PHASE MOTORS ARE PROTECTED AGAINST PRIMARY SINGLE PHASING CONDITIONS.
4. USE COPPER, COPPER CLAD ALUMINUM OR ALUMINUM CONDUCTORS. MAX 1/0 FOR HACR (T2 ONLY)
5. USE COPPER CONDUCTOR ONLY. MAX 1/0 FOR DISCONNECT.

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Fig. R — 50HCQ*12 Power Wiring Diagram — 460-3-60; 575-3-60

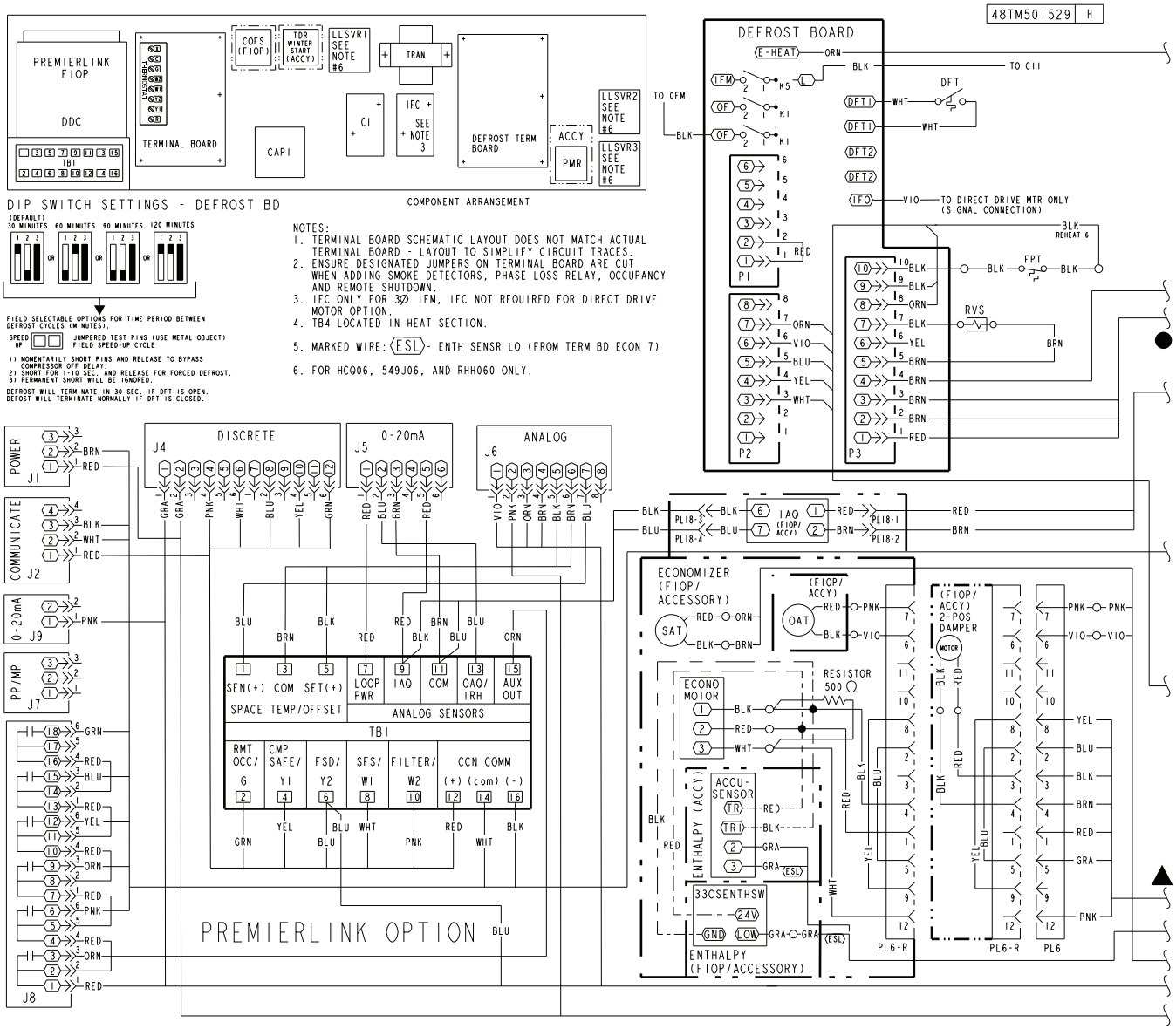

Fig. S — 50HCQ PremierLink™ Control Diagram

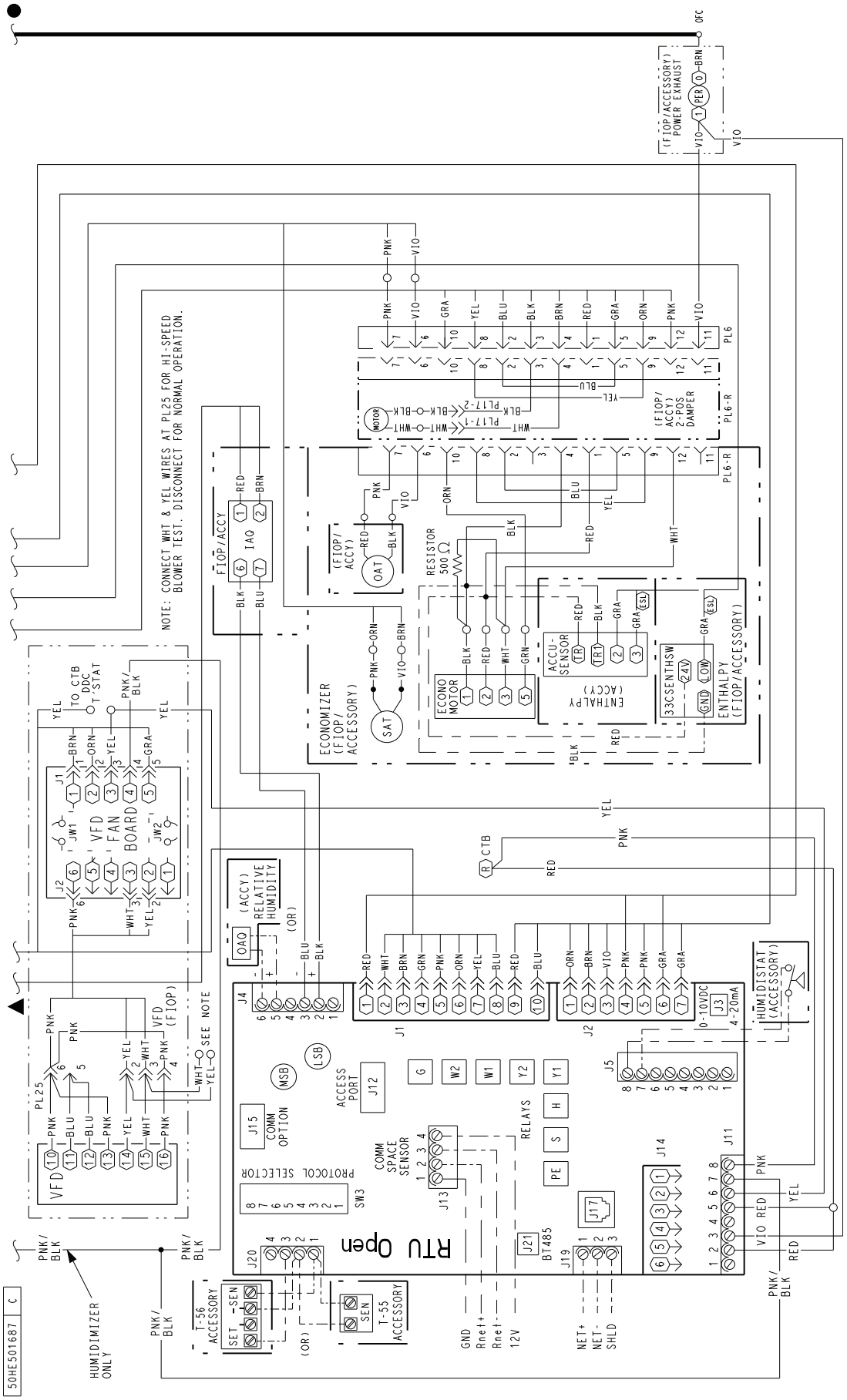

Fig. T — 50HCQ RTU—Open Control Diagram

APPENDIX F — MOTORMASTER® SENSOR LOCATIONS

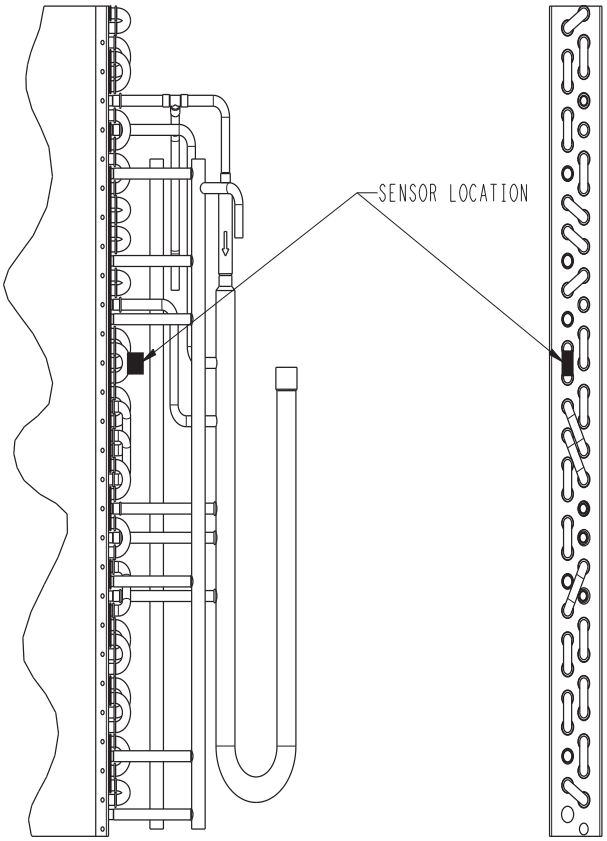

Fig. U — 50HCQA04 Outdoor Circuiting

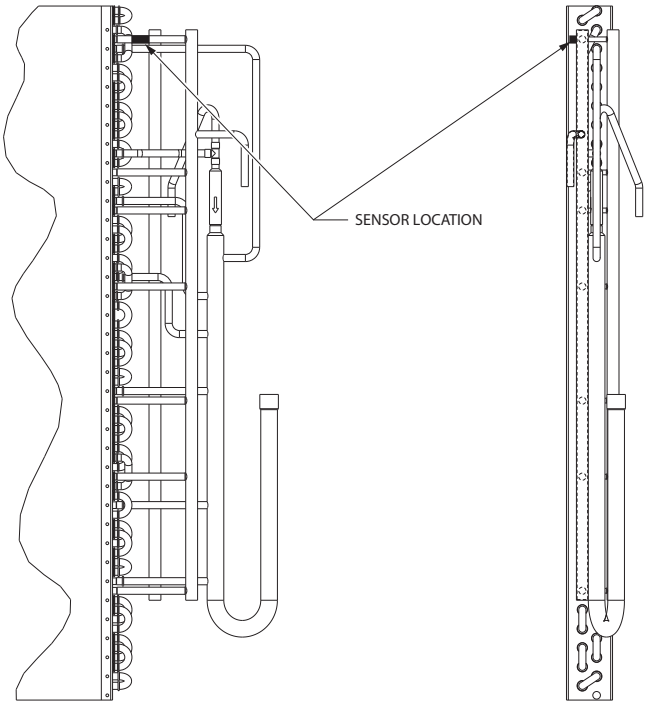

Fig. V — 50HCQA05/A06 Outdoor Circuiting

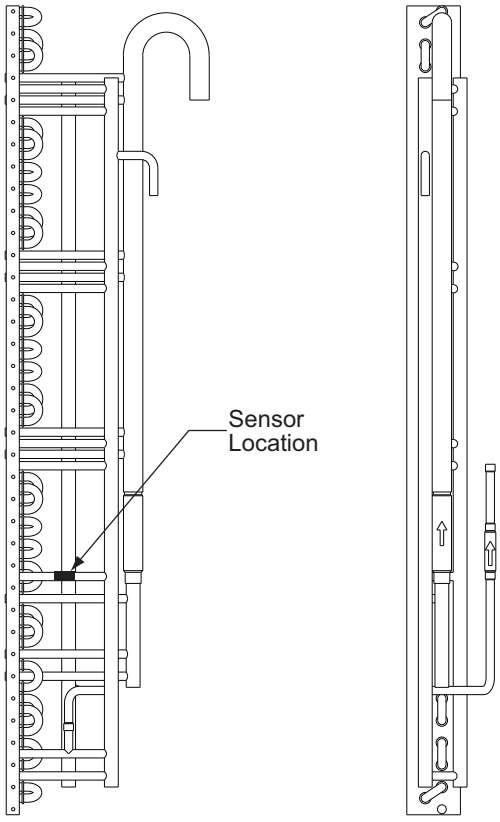

Fig. W — 50HCQA07 and 50HCQD07 Outdoor Circuiting

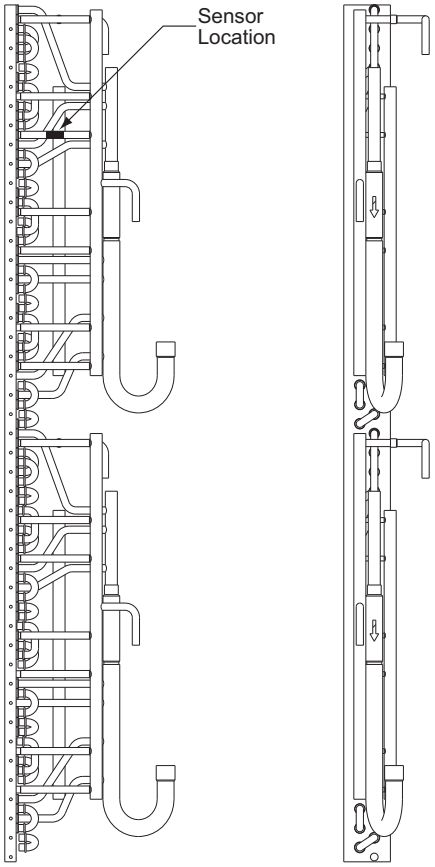

Fig. X — 50HCQD08/D09 Outdoor Circuiting

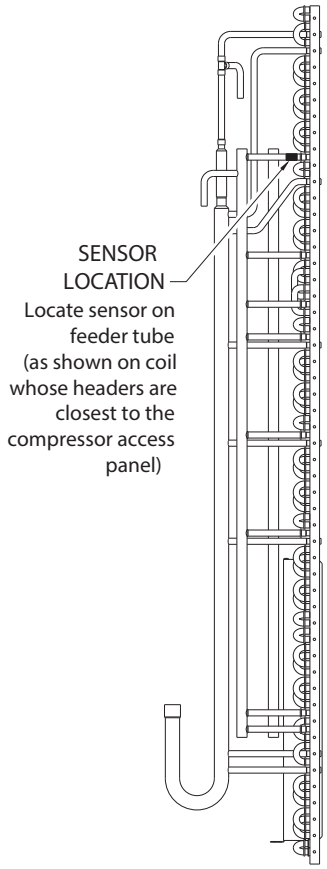

Fig. Y — 50HCQD12 Outdoor Circuiting

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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UNIT START-UP CHECKLIST

(Remove and use for Job File)

NOTE: To avoid injury to personnel and damage to equipment or property when completing the procedures listed in this start-up checklist, use good judgment, follow safe practices, and adhere to the safety considerations/information as outlined in preceding sections of this Service and Maintenance Instructions document.

I. PRELIMINARY INFORMATION:

MODEL NO.: _____ SERIAL NO: _____

DATE: _____ TECHNICIAN: _____

BUILDING LOCATION:_____

II. PRE-START-UP (insert check mark in box as each item is completed):

- ☐ VERIFY THAT ALL PACKAGING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTALLATION INSTRUCTIONS
- ☐ CHECK ALL ELECTRICAL CONNECTIONS AND TERMINALS FOR TIGHTNESS
- ☐ CHECK TO ENSURE NO WIRES ARE TOUCHING REFRIGERANT TUBING OR SHARP EDGES
- ☐ CHECK THAT RETURN-AIR FILTER IS CLEAN AND IN PLACE
- ☐ VERIFY THAT UNIT INSTALLATION IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE AND VERIFY SETSCREW IS TIGHT
- ☐ VERIFY PULLEY ALIGNMENT AND BELT TENSION ARE CORRECT

III. START-UP

ELECTRICAL

SUPPLY VOLTAGE	L1-L2	_____	L2-L3	_____	L3-L1	_____
COMPRESSOR AMPS	L1	_____	L2	_____	L2	_____
INDOOR FAN AMPS	L1	_____	L2	_____	L2	_____

TEMPERATURES

OUTDOOR-AIR TEMPERATURE	_____	DB	_____	WB
RETURN-AIR TEMPERATURE	_____	DB	_____	WB
COOLING SUPPLY AIR	_____	DB	_____	WB

PRESSURES

	_____		_____	
REFRIGERANT SUCTION	_____	PSIG	_____	TEMP _F
REFRIGERANT DISCHARGE	_____	PSIG		TEMP _F

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHARTS
- ☐ VERIFY THAT 3-PHASE SCROLL COMPRESSOR IS ROTATING IN CORRECT DIRECTION
- ☐ VERIFY SMOKE DETECTOR PROVIDES UNIT SHUTDOWN UTILIZING MAGNET TEST.

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

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